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Bibliography on Constants, Units, Tables and Diagrams

Vol. 2 April, 1951 No. 4

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY is a monthly publication devoted to:

A. Current Abstracts in English on important meteorological literature in every language.

B. Bibliographic references to other items of interest to the profession.

C. Selective, annotated bibliographies on subjects of immediate and special interest to meteorologists.

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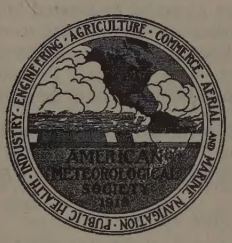
MALCOLM RIGBY, Editor

Vol. 2 April 1951 No. 4



SPECIAL FEATURE IN THIS ISSUE

A Selective Annotated Bibliography on Constants, Units, Tables and Diagrams

(For complete table of contents see back cover)

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FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to bring to the attention of meteorologists current literature in their field and in related fields and to provide bibliographic information on various subjects, as interest demands.

Part I contains from 100 to 200 abstracts of current periodical literature and monographs in the fields of meteorology, hydrology, oceanography, etc. These abstracts are arranged according to the Universal Decimal Classification.

Part II of each issue comprises a special annotated bibliography of from 50 to 250 important references on a special subject without respect to recency of material. No attempt is made to prepare exhaustive bibliographies; instead, the aim is to include a representative cross section of the various aspects of a subject. Preference is given to recent material, comprehensive works, material from obscure sources, and items with good bibliographies.

Vol. 1, No. 1–11, Jan.–Nov. 1950 carried the following bibliographies: *Atmospheric Pollution, Aerobiology, Cloud Physics and "Rainmaking," Hail, Tornadoes, Volcanic Dust, Climatic Changes, Thunderstorms, Icing, Acoustical Propagation* and *Evaporation.*

Bibliographies published this year were:

1. **Extended Forecasting,** Vol. 2, No. 1, Jan. 1951.
2. **Long Range Forecasting,** Vol. 2, No. 2, Feb. 1951.
3. **Soil Temperature,** Vol. 2, No. 3, March 1951.
4. **Constants, Units, Tables and Diagrams,** Vol. 2, No. 4, April 1951.

Forthcoming bibliographies will be:

5. **Climate of the Near East,** Vol. 2, No. 5, May 1951.
6. **Climate of the Middle East,** Vol. 2, No. 6, June 1951.
7. **Special Winds,** Vol. 2, No. 7, July 1951.

Other bibliographies in preparation are: *Carbon Dioxide in the Atmosphere, Climate and Cancer, Machine Methods in Meteorology, Microwave Transmission, Mountain Meteorology, Objective Forecasting, Radar Meteorology,* and *Turbulence.*

Part III contains a listing of the contents of those journals which are primarily meteorological. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. In the June and December issues cumulative indexes are published.

I the heir of all the ages in the foremost files of time.

Locksley Hall, TENNYSON

NOTES ON PROGRESS IN METEOROLOGICAL LITERATURE. I

In the introduction to the last issue a table was given showing the rate of publication of meteorological literature during the past 500 years. Although these figures are based on fairly crude adjustments of counts made from various sources, they do indicate the almost geometrical rate at which the literature has been expanding, and the fact that at a slight increase over the present rate of publication, as many articles will be published in the next 25 years as there were in the past 500 years.

This rate of increase has not, however, been uniform. The year-to-year tabulation of data compiled by HELLMANN and C. E. P. BROOKS shows that there have been some significant *slumps* in production due to wars (a drop from 1500 in 1913 to 700 in 1915, and a drop from 2400 in 1938 to 800 in 1940 and 1941) and to depressions: (2200 in 1931, 2000 in 1932) and on the other hand some phenomenal *jumps* in rate of production.

The first sudden increase in production occurred in the last part of the 15th century when observational material first began to be published (1480) and a number of semi-scientific or *practical* rules for weather prediction were first printed and distributed (1510). Probably the invention of printing was the main stimulus at that time, but the rate increased from an occasional publication in a decade to 5, 10 or more per year.

The next significant increase occurred at the end of the 16th century when instrumental observations first became available for analysis in many parts of western Europe. Between 1575 and 1580 the rate doubled and then kept on increasing for a quarter of a century when there was another *slump*.

The third remarkable increase in productivity of meteorological literature began with the establishment of scientific periodicals and journals in Paris, London, Florence, Amsterdam, Leipzig and other cultural centers between 1666 and 1700. Before 1666, all items of interest were in individual (book or monograph) form. Between 1666 and 1700 from 15–20% were in journals and over 80% were published individually. From 1700 to 1820 about 50% were in journals, and from 1820 to date about 75–80% are in journals.

The fact that the fourth upward turn of the rate of production of meteorological literature coincided with the above-mentioned increase in the percentage of material in journals (from $<50\%$ in 1795 to $>80\%$ in 1830), would lead one to guess that the reason was the establishment at that time of a number of journals devoted mainly to physical science. Among these are SILLIMAN'S *American Journal of Science* (1818 to date), POGGENDORFF'S *Annalen* (1824 to date), KASTNER'S *Archiv* (1824–1835) and the *Journal of the Franklin Institute* (1826 to date). In this period the number of articles published each year jumped from <100 to between 200 and 300, and remained at about that rate until the 1870's when the establishment of many national meteorological services, the appearance of several new journals devoted mainly to meteorology, and the founding of the International Meteorological Organization, created an interest which caused the number of articles to increase rapidly to >500 per year in 1880 and >1500 per year by 1900.

After 1900 there was no significant increase above the last mentioned figure until 1947 or 1948, when a host of new meteorological journals appeared, old ones were revived, and the wartime crop of meteorologists began publishing prolifically in all manner of journals. The annual rate for the past 15 years worked out by C. E. P. BROOKS (from Royal Meteorological Society and Meteorological Office bibliographies) is as follows:

1936	2330	1940	800	1944	1320	1948	3520
1937	2440	1941	770	1945	1860	1949	4300
1938	2400	1942	1050	1946	2110	1950	4630
1939	2020	1943	1110	1947	2410	*1951	5000

* estimated

Thus, it can be seen that we today are heirs to a vast amount of literature which would have been lost were it not for the scientific periodicals which date back as far as the 17th century and which are available in many libraries. Knowledge of the remaining 30 or 40% of the literature is available mainly through the untiring efforts of men like G. HELLMANN and C. E. P. BROOKS, who have each spent half a century in searching, cataloguing, indexing and publishing such information in bibliographies and other readily available works.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where the material may be found. The Union List of Serials (Gregory) is the source of most of the symbols used. In some cases, where no symbol has been assigned to a library, one will be devised according to the principles of the Union List.

Library symbols used in this issue may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory (and American Meteorological Society) Library, Milton, Mass.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicats a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by charts.

Geographic locations are in the English form rather than the form used locally, for example, Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwise stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to the Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months are abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Number (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus an entry will read as follows:

Meteorologische Rundschau, 2(5–6):146–151, May–June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, *Jahrgang* 2 (Vol. 2), *Heft* 5–6 (No. 5 and 6), *pages* 146–151, May–June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

GENERAL METEOROLOGY

2.4–1 55:551.5:06

Hesse, W., **Das Geophysikalische Institut der Universität Leipzig und das Geophysikalische Observatorium Collm.** [The Geophysical Institute of Leipzig University and the Collm Geophysical Observatory.] *Leipzig, Universität, Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 15:7–13, **1949. DWB**—An account of the founding of the Institute (Jan. 1, 1913) whose first director was V. BJERKNES. WENGER was director from 1917–1923 and L. WEICKMANN from 1923–1932 when he became director of the Geophysical Observatory at Collm. Work done by WEICKMANN'S assistants (LETTAU, STRANZ, PENNDORF and others) cited in detail. *Subject Headings:* **Geophysical institutes, Collm Observatory, Leipzig University.**—*M.R.*

2.4–2 551.5:523.43

Franck, James, **Possibility of photosynthesis on Mars.** (In **Atmospheres of the earth and planets,** Gerard P. Kuiper, (ed.) Chicago, University of Chicago Press, [1949]. p. 355–356. 2 refs.) **DLC**—From a consideration of existing information on the atmosphere and temperature of Mars it is concluded that photosynthesis on Mars is not identical with that on earth, and that plant life on Mars, if it does exist, may be based upon photo-reduction. The hypothesis of the existence of plant life on Mars does not constitute a unique explanation of the green color. The variations of color with seasons may be explained by a change in the degree of hydration of minerals or salts concentrated near the equator of Mars. *Subject Headings:* **Planetary atmospheres, Photosynthesis, Mars.**—*I.L.D.*

2.4–3 551.5:523.78:551.590.24

Ushiyama, U., Narita, F., Suzuki, Y. and Suzuki, T., **The variation of the surface meteorological elements.** In: Report of Solar Eclipse Observation May 9, 1948. *Geophysical Magazine, Tokyo*, 19(3–4):78–94, Dec. **1949.** 8 figs., 9 tables. In English. **MH-BH**—At 53 stations, hourly meteorological observations were made on May 8, 9 and 10 and every ten minutes during the eclipse. Observations were made of air pressure, air and soil temperature, relative humidity, vapor pressure, wind direction and velocity, cloud type, cloudiness, direction and velocity of clouds and intensity of solar radiation. The data are presented numerically and graphically. The behavior of these meteorological elements during the passage of the eclipse at various weather stations in its path is discussed. The influence of the eclipse upon these meteorological elements is as follows: air temperature fell from 0.7° to 2.5°C., the time of retardation of minimum soil temperature ranged between 8 and 32 minutes, definite pressure changes could not be ascertained, relative humidity increased after maximum obscuration and vapor pressure diminished shortly before maximum obscuration, cloudiness increased as eclipse advanced and diminished after maximum of eclipse; the observed values of intensity of solar radiation coincided well with computed values of total and sky radiation. *Subject Headings:* **Meteorological elements, Solar eclipses, Japan.**—*I.L.D.*

2.4–4 551.5.523.78

Wadati, K., **Astronomical data, program, weather and synopsis.** In: Report of solar eclipse observation May 9, 1948. *Geophysical Magazine, Tokyo*, 19(3–4):57–66, Dec. **1949.** 3 figs., tables. In English. **MH-BH**—The course of the annular eclipse of May 9, 1948 and the synoptic conditions over Japan are described. The studies on solar and sky radiation, meteorological elements, upper air observations, on condensation nuclei, cloud and fog par-

ticles, variations of meteorological elements with height, on turbulence, on magnetic and on electric variations are summarized briefly. *Subject Headings:* **Meteorological elements, Solar eclipses, Japan.**—*I.L.D.*

2.4–5 551.5:625.1

Kasamura, Y., **Fires along the railroad and weather in Ōita. (1st Report.)** *Journal of Meteorological Research*, Tokyo, 2(8):244–249, July **1950.** fig., 2 tables, 8 refs. In Japanese, English summary p. (5–6). **DWB**—Most fires along the railroad originate from cinders, frequently around March in the mountain area. Usual pressure type: in winter high to the west, in spring traveling high. Humidity is low (below 60–40%) and wind strong (above 7.8 m./sec.). *Subject Headings:* **Fire weather, Railways, Oita, Japan.**—*C.E.P.B.*

2.4–6 551.5:629.13

How fatal is weather? *Aero Digest*, 61(2):17, 99–100, Aug. **1950.** chart, table. **DLC**—Fatal airplane accidents are tabulated by states and shown on map of U.S.A. More private pilots (70%) were killed because of weather than were commercial pilots (25%). A combination of rough terrain and poor weather appears to be the cause of most of the fatal accidents. Pilots flying without instruments are by far the greatest contributing factor in the high (and rising) fatality rate. *Subject Headings:* **Aeronautical meteorology, Aircraft accidents.**—*M.R.*

2.4–7 551.5:632

Hogben, G. L., **The weather and plant-protection substances.** *Weather*, 5(11):368–370, Nov. **1950. DWB**—Brief notes on how temperature, humidity and rain govern time of application of insecticides, fungicides and weed-killers; effect of turbulence and convection on spraying, dusting, etc. *Subject Headings:* **Crop dusting, Agricultural meteorology.**

2.4–8 551.5:678

Crabtree, J., **Rubber and the weather.** *Bell Laboratories Record*, 26(3):119–123, March **1948.** 7 figs., photo of author. **DLC**—Effect of exposure of rubber to sunlight, moisture, oxygen and especially to ozone is discussed. Equipment devised for studying in the laboratory the effect of ozone on rubberized materials is illustrated and described. Separate roles of oxygen, sunlight and ozone now more clearly defined. *Subject Headings:* **Ozone, Weathering of materials.**—*M.R.*

2.4–9 551.5:92

Georgi, J., **Regierungsrat a.D. Dr. Paul Perlewitz.** [Dr. Paul Perlewitz, retired Councilor of the Government of Germany.] *Annalen der Meteorologie*, 3(3–4):106, **1950. DWB, MH-BH**—Note on the death of one of the last of KÖPPEN'S colleagues. DR. PERLEWITZ was active in the early development of aerological work, and on his 65th birthday had 213 publications to his credit. *Subject Headings:* **Paul Perlewitz, Biography.**—*M.R.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

OBSERVATIONS

2.4–10 551.501.45

Bernasconi, Carlo, **Sull'analisi periodale dei diagrammi.** [On the analysis of diagrams for periodicity.] *Geofisica Pura e Applicata*, 16(3–4):181–187, April–June **1950.** 6 figs., 5 refs., 2 equations. Italian and English summaries p. 181. **MH-BH**—A photoelectric device is illustrated and described which will perform periodic or harmonic analyses by use of the systems of Labrouste (1943) and Vercelli (1940). Lovera's (1948) electrical analyzer is also described and illustrated, with suggestions for improvement. Theory of rapid selection of combinations for use in harmonic analysis is also treated. *Subject Headings:* **Periodograms, Harmonic analysis, Electronic computers.**—*M.R.*

2.4–11 550.501.9:523

Korff, Serge A., **High altitude laboratories.** *Physics Today*, 3(11):17–23, Nov. **1950.** 4 photos. **DLC**—A stimulating article discussing the present distribution of high altitude

observatories in the world and showing where other stations, at even higher elevations, could be established to provide valuable information on upper atmospheric physics, which would be useful to meteorologists, astronomers, glaciologists, radio-physicists, astro-physicists, etc. *Subject Headings:* **Geophysical laboratories, Astrophysical observatories, Mountain meteorology.**—*M.R.*

2.4–12 551.501.9:551.521.1 551.509.33

Abbot, Charles Greeley, **The Astrophysical Observatory of the Smithsonian Institution.** *Smithsonian Report for 1948*, **1949.** p. 167–175. 5 figs., 6 plates, 5 refs. Reprint available. **MH-BH**—An account of work on the infrared spectrum of solar radiation, solar constant and forecasting temperature and precipitation by solar periodicities. *Subject Headings:* **Astrophysical observatories, Smithsonian Institution, Radiation research, Long range forecasting.**—*C.E.P.B.*

2.4–13 551.506.1:77(4)

*Great Britain. Meteorological Office, **British Rainfall 1943, 1944, 1945. Combining the eighty-third, eighty-fourth and eighty-fifth annual volumes of the British Rainfall Organization.** London, H. M. Stationery Office, **1950.** 278+p. numerous maps and tables. At head of title: M.O. 505. **MH-BH**—This abridged and consolidated report is similar to those for 1940, 1941 and 1942. Contains data on rainfall, rain days, droughts, wet spells, evaporation (13 stations), percolation, excessive rainfall, etc. The data are arranged by elements and also by counties for England, Scotland, Ireland and Wales. Numerous charts show monthly distribution and percent of normal, etc. Chronological summary of weather for the 3 years by periods or spells is given. Describes rainfall network and service. No snowfall data. *Subject Headings:* **Rainfall data, Great Britain.**—*M.R.*

2.4–14 551.506.5(988)

Victor, Paul E., **The French Polar Research Expeditions 1948–1951.** New York, French Embassy Press and Information Division, **1950.** 22 p. fig., photos, maps. **MH-BH**—Mainly an account of the setting up by motorized transport and parachute of a meteorological (including radiosonde) and glaciological station in 1949, very near Eismitte, 70°54′N, 40°42′W, 9900 ft., and its occupation in 1950–51. Lowest temperature −86°F. *Subject Headings:* **Arctic expeditions, Greenland.**—*C.E.P.B.*

INSTRUMENTS

2.4–15 551.508:92

Skelton, P. N., **Centenary of Messrs. Negretti and Zambra 1850–1950.** *Meteorological Magazine, London*, 79(940):286–287, Oct. **1950.** 2 photos. **MH-BH**—Brief biographies of Henry Negretti and Joseph Warren Zambra and history of this well known firm of instrument makers. *Subject Headings:* **Instrument makers, Biography.**

2.4–16 551.508.21

Aldrich, L. B. and Abbot, Charles Greeley, **Smithsonian pyrheliometry and the standard scale of solar radiation.** *Smithsonian Miscellaneous Collections*, 110(5), April 15, **1948.** 4 p. table, 5 refs. **MH-BH**—An improved water-flow standard pyrheliometer was constructed in 1947 and compared with corrected readings of silver disk standards 5 bis and 79. Mean constants were determined as .3626 and .3650, p. e. .0003. *Subject Heading:* **Pyrheliometers.**—*C.E.P.B.*

2.4–17 551.508.21

Abbot, Charles Greeley, **The Smithsonian standard pyrheliometry.** *Smithsonian Miscellaneous Collections*, 110(11), Aug. 5, **1948.** 4 p. 2 refs. **MH-BH**—Description of standard instrument measuring rise of temperature in a water flow heated by absorbed radiation, for calibrating silver disk pyrheliometers, and modification in 1932 to balance solar against electrical heating. Silver disk constants are too high by 2.3%. *Subject Heading:* **Pyrheliometers.**—*C.E.P.B.*

2.4–18 551.508.21

Aldrich, L. B., **The Abbot silver-disk pyrheliometer.** *Smithsonian Miscellaneous Collections*, 111(14), Dec. 8, 1949. 11 p. fig., plate, 6 refs. **MH-BH**—A description with diagram of pyrheliometer developed in 1909, and an account of later modifications (lengthening of tube to reduce sky area), directions for setting up and using, example of reduction and list of instruments in use and their constants. *Subject Heading:* **Pyrheliometers.**—*C.E.P.B.*

2.4–19 551.508.21:551.521.1:551.501.9

De Pasquale, Oreste, **La misura della radiazione solare (globale) a scopo sinottico e l'attinografo bimetallico di Robitzsch ulteriormente perfezionato.** [Measurement of solar (global) radiation for synoptic purposes and the ultimate perfection of the Robitzsch bimetallic actinometer.] *Rivista di Meteorologia Aeronautica*, 10(2):10–20, April–June 1950. 8 refs. Italian, French, English and German summaries p. 10. **MH-BH**—The author considers the installation of actinometers at airport observatories and the use of resulting measurements of global radiation in synoptic analyses of the utmost importance. An elaborate plan, including the adaptation of the Robitzsch actinograph in a manner similar to that effected at the Messina aeronautical observatory, is presented for use in Italy and eventually for international use (involving change in synoptic code). *Subject Headings:* **Actinometry, Synoptic networks, Solar radiation measurements.**—*M.R.*

2.4–20 551.508.25:551.521.61

Barr, E. E., **Interim engineering report on filter research.** *U. S. Air Force Cambridge Research Laboratories, Interim Engineering Report*, No. 3, [1950]. 5 leaves, graphs. Mimeographed. (Contract No. AF 19(122)–243.) **DWB**—The author describes the experimental procedure for producing filters with reflection bands half the width of the primary band of a conventional Dennison-Hadley filter without introducing secondary bands between the first and second order bands of the primary filter. The procedure consists of adding successive layers of dielectric and semi-conducting layers. Its application to the Dennison-Hadley filter is described, including the process of finding the proper rhodium thickness to accompany each additional dielectric stibnite layer. A spectrogram of a filter, showing no secondary reflection peaks, is given. *Subject Headings:* **Radiation filters, Infrared radiation.**—*I.L.D.*

2.4–21 551.508.25:551.521.4

Tousey, R., Koomen, M. and Dunkelman, L., **A visual photometer for measuring the brightness of the night sky.** *American Geophysical Union, Transactions*, 31(4):547–548, Aug. 1950. 2 figs., ref. **MH-BH**—The authors describe a special design of a visual photometer with comparison field illuminated by a self-luminous phosphor button. It has no electrical circuits, lamps, meters or batteries and has a lower brightness limit of 0.010μ L. A diagram of the optical system of the visual photometer and a photograph of the instrument mounted on a tripod are given. *Subject Headings:* **Photometers, Light of the night sky.**—*I.L.D.*

2.4–22 551.508.43

Polli, Silvio, **Su di un microbarografo modificato.** [On a modification of the microbarograph.] *Annali di Geofisica*, 2(1):103–112, Jan. 1949. 8 figs., table, 4 refs. Reprint available. **MH-BH**—A large microbarograph (capacity 50 dm^3) with a fine adjustable aperture constructed in 1937 was improved by substituting a light manometer for the original rubber diaphragm and a fine glass tube as a pen. The magnification is 50. Specimen records are illustrated and discussed. Oscillations of the atmosphere had periods of 2–7 sec. (also microseisms) and amplitudes up to 0.03 mm. Hg. *Subject Heading:* **Microbarographs.**—*C.E.P.B.*

2.4–23 551.508.91

Ohta, S., **On a simple nucleus-counter.** *Meteorological Society of Japan, Journal, 2nd Ser.*, 28(5):157–161, May 1950. 2 figs., 2 tables. In Japanese, English summary p. 160–161. **DWB**—Improvements were made in Aitken's nucleus counter. Observations on Mt. Fuji showed it to function excellently. *Subject Headings:* **Nuclei counters, Mt. Fuji, Japan.**

2.4–24 551.508.91

Ohta, S., **On the wall-effect of a nucleus-counter.** *Meteorological Society of Japan, Journal, 2nd Ser.*, 28(5):161–167, May **1950.** fig., 2 tables. In Japanese, English summary p. 167. **DWB**—A thin ($\frac{1}{4}$ mm.) boundary layer in which no fog is formed exists along surface of a cloud chamber, decreasing with increasing speed of expansion. It is attributed to thermal conduction from the wall. This is important, as nuclei in the layer near the wall escape observation and repeated expansions of the same sample of air are necessary. *Subject Heading:* **Nuclei counters.**—*C.E.P.B.*

2.4–25 551.508.94

Goldschmidt, J., **Neukonstruktion eines Einfadenelektrometers.** [Construction of a new single-thread electrometer.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 3(1–2):98–101, **1950.** fig. German, English and French summaries p. 98. **MH-BH**—Author describes and illustrates a new electrometer of the type of Wulf and Lutz-Edelmann. It is fitted with a high ohm resistance, the temperature of which can be measured and kept constant. *Subject Heading:* **Electrometers.**—*C.E.P.B.*

2.4–26 551.508.98

Wierzejewski, H., **Theoretisches und Konstruktives zur Messung der Abkühlungsgrösse.** [Theory and practice in the measurement of cooling power.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 2(1–2):65–85, **1950.** 4 figs., 22 refs., 9 equations. German, English and French summaries p. 65–66. **MH-BH**—Cooling power of the air is important in bioclimatology. The effect of various factors is set out and the heat balance finally expressed in an approximate equation involving only wind, air temperature and short-wave radiation. The principles of various instruments for measuring it (including the katathermometer) are briefly described. The construction and usage of the new (1931) type of Davos frigorimeter are described and the constants set out. This instrument measures electrically the heat loss of a copper sphere (blackened chemically) heated electrically. Cooling power varies rapidly and instruments for obtaining hourly records are mentioned. (*See item* 2.3–90 *Meteorological Abstracts*, March 1951.) *Subject Headings:* **Davos frigorimeter, Katathermometers, Cooling power.**—*C.E.P.B.*

SYNOPTIC ANALYSIS AND FORECASTING

2.4–27 551.509(261)(81)

†*§Vuorela, Lauri A., **Synoptic aspects of tropical regions of the Atlantic Ocean, West Africa and South America.** *Helsinki, University, Meteorologian laitos, Mitteilungen*, No. 67, **1950.** 130 p. 47 figs., 46 charts, 14 tables, 32 refs., 10 append. **DWB**—A thorough synoptic aerological study of conditions over the Atlantic, especially the tropical part, during a voyage from northwest Europe to Buenos Aires and back in the fall of 1939. The expedition was led by VÄISÄLÄ and was supported by many institutions. Besides other surface and aerological observations, 112 radiosondes (Finnish) were released and evaluated. Many excellent charts, cross sections and illustrative diagrams are included. Conclusions regarding disturbances in easterlies and flow patterns over the tropical Atlantic, as well as synoptic conditions over South America, are given. *Subject Headings:* **Tropical meteorology, Synoptic analysis, Atlantic Ocean, West Africa, South America.**—*M.R.*

2.4–28 551.509.25

Visconti, Italo, **Alcuni lavori sulla previsione delle carte bariche in quota mediante metodi di correlazione.** [Some works on the forecasting of upper baric charts by the correlation method.] *Rivista di Meteorologia Aeronautica*, 10(2):27–30, April–June **1950.** 3 figs., 6 refs. Italian, French, English and German summaries p. 27. **MH-BH**—A review of the work of HESS and WAGNER (1948) on the use of correlations between pressure and temperature changes at 3 km. in constructing prognostic charts, and of similar work by NAMIAS, NYBERG, OLIVER and others. Illustrative charts included. *Subject Headings:* **Prognostic charts, Pressure-temperature correlations.**—*M.R.*

2.4–29 551.509.3

Gringorten, Irving I., **Forecasting by statistical inferences.** *Journal of Meteorology*, 7(6):388–394, Dec. **1950.** 3 figs., 10 refs., 3 equations. **MH-BH**—A method of using the probability of meteorological events for objective forecasting of meteorological events for operational needs is presented. The forecast requirements are represented by critical frequencies and their determination is described. From a knowledge of the statistical frequency of the meteorological events to be forecast, or predictands, and of the antecedent condition, or predictors, prediction can be made by inference. The determination of the probability and confidence limits of predictands and predictors is described; the application of predictor combinations to forecasting is illustrated; a modification of Tschuprow's coefficient of contingency is developed for evaluating objectively the efficiency of predictor combinations. The author points out that this technique of objective forecasting is essentially similar to the procedures of subjective forecasting. *Subject Headings:* **Objective forecasting, Statistical forecasting.**—*I.L.D.*

2.4–30 551.509.312

Kao, Shih-kung, **The vertical speed of an isobaric surface and prognostic contour chart.** *Meteorological Magazine, Nanking*, 19(1–4):51–57, Aug. **1947.** 2 figs., ref., 21 equations. In Chinese, English summary p. 51. **MH-BH**—An expression is developed by which the vertical movement of an isobaric surface can be calculated from radiosonde data. This enables a prognostic pressure chart to be drawn. *Subject Heading:* **Prognostic charts.**—*C.E.P.B.*

2.4–31 551.509.312

Syono, Sigekata, Gambo, K., Sasaki, Y., and Koide, A., **On numerical prediction** (I). *Meteorological Society of Japan, Journal, 2nd Ser.*, 28(3):77–99, March **1950.** 11 figs., ref., 98 equations. In English, Japanese summary p. 99. **DWB**—A highly mathematical paper on the possibility of predicting the future variation of any quantity, knowing the existing state at any instant and the laws that govern its variation at that instant. Unforeseen changes of these laws are ruled out. This is applied to pressure waves in one dimension, exemplified by variations of the upper westerlies and 1–2 day forecasting of their components; 2-day forecasting was not satisfactory. *Subject Heading:* **Statistical forecasting.**—*C.E.P.B.*

2.4–32 551.509.3:551.515

Baur, Franz, **Der allgemeine Luftkreislauf und seine Schwankungen nebst Vorschau auf die Sommerwitterung 1950 in Deutschland.** [General atmospheric circulation and its oscillations and forecast of the weather for the summer of 1950 in Germany.] *Naturwissenschaftliche Rundschau*, 3(6):241–243, June **1950.** 7 figs., table, 2 refs. **DWB**—The author describes the general atmospheric circulation and the principal circulation patterns prevailing over Europe, namely: west–east zonal circulation over central Europe, west–east zonal circulation over northern Europe, east–west zonal circulation, subtropical and polar meridional circulation and meridional highs and lows. These circulation types differ in their degrees of stability, in their dependence upon the season and the circulation system. A particular relationship between circulation, atmospheric pressure distribution and general weather situation, which can be employed in long range forecasting, is described. Thus, when the meridional low, the polar meridional circulation and the central European west–east circulation predominate in the spring they will also continue during the summer, which will then have an abnormally heavy rainfall. The author predicts that in Germany the summer of 1950 will not be dry, as a whole. *Subject Headings:* **Long range forecasting, Atmospheric circulation, Germany.**—*I.L.D.*

2.4–33 551.509.3

Baur, Franz, **Witterungsaussichten für den Winter 1950/51.** [Weather outlook for the winter 1950/51.] *Naturwissenschaftliche Rundschau*, 3(11):500–502, Nov. **1950.** 2 tables, 7 refs. **DLC**—The author analyzes the relationship between weather anomalies in summer and the following winter. Data are given for the years 1761 to 1950 in which the midsummer temperatures in central Europe are 0.6°C. too warm and temperatures of July and August are each 0.2°C. too warm. A summer characterized by these temperature anomalies, by a warm

June and a rainy July is followed by a colder than usual winter; when July, August and September are warmer than usual, July and August each at least 0.2°C. and September no more than 1.9°C. too warm, and midsummer as a whole is 0.6°C. too warm, then the following winter is colder than usual. Also the relationship between zonal and meridional atmospheric pressure differences and the general weather situation is analyzed by means of data on atmospheric pressure in the Azores and Iceland and subsequent winter temperature in central Europe. When the pressure deviation from the first to the twentieth of September is positive at Ponta Delgada (Azores) and negative at Stykkisholm (Iceland) and the mean pressure difference exceeds by 1 mb. the long term mean, then the following winter is colder than usual. On the basis of these rules, the 1950/51 winter in central Europe is predicted to be colder than normal. *Subject Headings:* **Long range forecasting, Europe.**—*I.L.D.*

2.4–34 551.509.33:551.577(911)

Euwe, W., **Forecasting rainfall in the periods December–January–February and April–May–June for parts of Celebes and South Borneo.** *Indonesia, (K.) Magnetisch en Meteorologisch Observatorium te Batavia, Verhandelingen*, No. 38, [1949]. 24 p. 10 tables, 6 refs., 39 equations. **DWB**—Using rainfall data for 60 stations in Celebes and Borneo (1911–1940), pressure data for various island stations in the tropics (Kupung, Hokitika, Apia, Honolulu, Manila and Mauritius, and Santiago) and temperature data for Hongkong; multiple regression equations were set up and tested for the purpose of forecasting Dec.–Feb. and April–June rainfall in several sections of Celebes–Borneo. Only data for 1941 was available for testing goodness of theory and disappointing results were obtained, owing to the year 1941 being one similar to 1920 and 1932 when variations were marked. *Subject Headings:* **Long range forecasting, Statistical forecasting, Precipitation forecasting, Celebes, Borneo.**—*M.R.*

2.4–35 551.509.33:551.577(922)

Euwe, W., **Forecasting rainfall in the period December–January–February for Java and Madura.** *Indonesia, (K.) Magnetisch en Meteorologisch Observatorium te Batavia, Verhandelingen*, No. 39, [1949]. 16 p. 8 tables, 7 refs., 23 equations. **DWB**—Rainfall data for 1911–1940 for 42 stations on the north coast of Java and on the island of Madoera were used in connection with mean monthly air pressure at Kupang, Hokitika, Apia, Santiago, Honolulu, Manila, Mauritius, and mean monthly air temperature at Hongkong to set up a regression equation for forecasting rainfall during the west monsoon period. Testing multiple regression equations against 1941 it appears that differences between computed and observed values are too large. *Subject Headings:* **Long range forecasting, Statistical forecasting, Precipitation forecasting, Java.**—*M.R.*

2.4–36 551.509.33:519.2

Rodewald, Martin, **Zur Frage der Winter-Vorbereitung durch die Zirkulationsentwicklung vom Oktober bis Dezember. Zugleich eine Erwiderung an F. Baur.** [On the question of the preparation for winter through the development of the circulation from October to December. Also a reply to F. Baur.] *Annalen der Meteorologie*, 3(7–8):225–240, **1950.** 4 figs., 7 tables, 13 refs. German and English summaries p. 225. **DWB**—Author rejects BAUR's criticism of his suggested relation between pressure change Nov.–Dec. and character of central European winter, and discusses the character of the circulation between N.E. Atlantic and N.W. Siberia in relation to exceptional winters. The circulation pattern preceding severe winters is shown schematically for October and November, marked by a N.E. displacement of a N. Atlantic positive anomaly and a corresponding deformation pattern in upper air in winter, with a W.S.W. transgression of cold anomaly from Siberia to France. A "prognostic rule" is stated and exceptions examined in relation to sunspot numbers. *Subject Headings:* **Long range forecasting, Severe winters.**—*C.E.P.B.*

CLOUD SEEDING AND ARTIFICIAL PRECIPITATION

2.4–37 551.509.65:551.509.66:551.574.1

Pauthenier, M., **Electrical coalescence of fog and clouds.** Royal Meteorological Society, Centenary Proceedings **1950.** p. 60–61. 2 refs., equations. **MH-BH**—Summary of papers

by PAUTHENIER on clearing of fogs by seeding with charged droplets. *Subject Headings:* **Fog dissipation, Cloud dissipation, Condensation nuclei.**

2.4–38 551.509.66:551.509.67:551.574.1

Schaefer, Vincent J., **The effects produced by seeding supercooled clouds with dry ice and silver iodide.** Royal Meteorological Society, Centenary Proceedings 1950. p. 42–50. 6 figs., 15 refs. **MH-BH**—After a historical introduction, the present field and laboratory studies by Project Cirrus (U.S.A.) are listed. Concentration of ice particles varies from less than 10 to more than $10^7/m^3$; at least 10^4 is required for cloud transformations to occur and persist. Results of seeding are described and illustrated by striking photos. The discussion, p. 63–65, is mainly on this paper. *Subject Headings:* **Cloud seeding, Artificial precipitation, Condensation nuclei.**

2.4–39 551.509.67

Flohn, Hermann, **Künstliche Erzeugung von Regen?** [Artificial rain making?] *Naturwissenschaftliche Rundschau*, 3(2):78–79, Feb. 1950. **DA**—A brief and critical review of various attempts made in the United States, South Africa and Australia to produce artificial precipitation. German work on the formation of ice crystals under experimental conditions, under natural conditions in clouds (H. Weickmann) and in supercooled ground fog (E. Wall) and American work on seeding with silver iodide and dry ice are discussed. The author concludes that artificial rain can be produced only from such clouds which would yield rain naturally. Of significance is the proportion of ice crystals to supercooled water drops in the cloud; the most favorable rates for the production of rain is $1:10^3$. *Subject Headings:* **Cloud seeding, Artificial precipitation.**—*I.L.D.*

2.4–40 551.509.67(569.4)

Israel. Rainfall Research Committee, **A preliminary report on experiments for the production of artificial rain in Israel.** Hakirya, 1950. 3 p. Mimeographed. **MH-BH**—Clouds were seeded with dry ice and with an aqueous suspension of silver iodide. Methods of seeding and verifications are described. Only 7 of 14 clouds seeded were considered suitable for artificial production of rain. In two cases, showers resulted; in two more, rain was produced but could not be attributed to seeding; in two others, virga followed the seeding. The other 7 clouds were either limited in vertical extent by inversions or their tops had a temperature above −8°C. and seeding either lowered their cloud tops or dissipated them. *Subject Headings:* **Cloud seeding, Artificial precipitation, Israel.**—*I.L.D.*

2.4–41 551.509.67

Katchalsky, E. and Neumann, Hava, **Preparation of colloidal silver-iodide water-suspensions for nucleation of supercooled clouds.** *Nature, London*, 165(4189):244–245, February 11, 1950. photo, 5 refs. **DWB**—The method of preparing colloidal silver iodide water suspension is described. The size of the particles is 0.1μ in diameter and the particles are of the same order of magnitude as those obtained in the generation of smoke by vaporizing silver iodide. The silver iodide produced clouds in a refrigerator and showed no aging when tested after 14 days. *Subject Headings:* **Cloud seeding, Silver iodide.**—*I.L.D.*

2.4–42 551.509.67

Rainmakers need a better yardstick. *Engineering News-Record*, 145(13):34–35, Sept. 28, 1950. **DLC**—An interview with Dr. W. E. HOWELL regarding the results of attempts to increase the New York water supply by artificial seeding of clouds. No certainty exists as to the success of artificial inducement experiments, but statistical tests are being conducted which will show eventually the significance of any increase in rainfall over chance. *Subject Headings:* **Artificial precipitation, New York.**—*M.R.*

2.4–43 551.509.67

†*Roldán Seminario, Ernesto, **Notas sobre lluvia artificial.** [Notes on artificial rain.] *Sociedad Geográfica de Lima, Boletin*, 65(3–4):1–79+, 1948. figs., photos, tables (incl. cloud frequency data), 46 refs. **DLC**—A detailed review of the entire field of cloud physics and

seeding as reported in the current literature during 1947 and 1948, plus an analysis of cloud and upper air temperature conditions on the coast of Peru. A chronological list of cloud seeding attempts in the U.S.A. from Nov. 13, 1946 to Oct. 1947 is included. Monthly means and frequencies of cumulus cloud, rainfall, runoff and other data are given *in extenso*. Two unsuccessful attempts at making rain in Peru by cloud seeding are reported. (*Same item as* C–157 in March 1950, *Meteorological Abstracts.*) *Subject Headings:* **Cloud seeding, Cumulus cloud data, Peru.**—*M.R.*

2.4–44 551.509.67

Vonnegut, Bernard, **Techniques for generating silver iodide smoke.** *Journal of Colloid Science*, 5(1):37–48, Feb. 1950. 6 figs., 7 refs. **DLC**—Silver iodide smoke for seeding supercooled clouds may be generated by either a charcoal burning device (wherein the charcoal is impregnated with silver iodide) or a spray nozzle type smoke generator. Charcoal burners for ground or airplane use, and a new turbo-jet burner for producing large numbers of particles, are described. Methods of preparing solutions of silver iodide, numbers of nuclei produced per second, etc. are discussed. *Subject Headings:* **Cloud seeding, Silver iodide smoke generators.**—*M.R.*

2.4–45 551.509.67(04)

Weather or not. *Time*, 56(9):52–56, Aug. 28, 1950. 6 photos, picture of Dr. Langmuir on cover. **DLC**—A semi-popular account of the history of cloud seeding techniques worked out by Langmuir and Schaefer, and applied by them to show the possibility of weather control—especially the relief of drought by cloud seeding. Applications in New York by Howell and in the Far West by Irving Krick are also discussed. Mention is made of the experiments by Dr. Workman at the New Mexico School of Mines Laboratory. Photographs of all of the above named investigators are included. *Subject Headings:* **Cloud seeding, Artificial precipitation, Irving Langmuir.**—*M.R.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

STRUCTURE OF THE ATMOSPHERE

2.4–46 551.510.41:551.57

†Bates, David R. and Nicolet, Marcel, **The photochemistry of atmospheric water vapor.** *Journal of Geophysical Research*, 55(3):301–327, Sept. 1950. 2 figs., 5 tables, 70 refs., 86 equations. **MH-BH**—The concentration of OH radicals is estimated to fall to 10^{-5} at tropopause. They are formed by dissociation of water vapor by sunlight. These and other hydrogen compounds are broken up at about 90 km. The hydrogen escapes to space; the oxygen remains and the amount added to the atmosphere during geological time is roughly equal to that present. The reactions between H and O_2 are considered responsible for night sky light. *Subject Headings:* **Water vapor, Atmospheric composition.**—*C.E.P.B.*

2.4–47 551.510.41:551.510.534

Malurkar, S. L., **Photolysis of atmospheric ozone in presence of water vapour.** *Science and Culture*, 16(2):70–72, Aug. 1950. 10 refs., equations. **MH-BH**—The author discusses the theoretical and experimental evidence for the photolysis of ozone under the influence of water vapor and ultraviolet radiation. A possible series of reactions for the photolysis of ozone combining H_2O is suggested, namely:

$$O_3+H_2O+h\nu=O_2+H_2O_2;\ h\nu+H_2O_2=2OH$$
$$2H_2O_2+h\nu=2H_2O+O_2$$

A less probable alternative is the following reaction:

$$h\nu+H_2O_2=H_2O+O$$

Subject Headings: **Atmospheric composition, Ozone.**—*I.L.D.*

2.4–48 551.510.41:551.578.11

Miyake, Y. and Sugiura, Y., **A study on nitrogen compounds in the atmosphere.** *Geophysical Magazine, Tokyo*, 22(1):1–4, Oct. 1950. 3 figs., 3 tables, 7 refs. In English. **MH-BH**

—The amount of ammonia, nitrate and nitrite in the air varies from season to season and the same is true of the amount in rainwater. In the latter case the amount varies with the amount of rainfall, as is shown by graphs. The author made analyses in Tokyo from Feb. to Dec. 1948, and presents briefly the results and conclusions. *Subject Headings:* **Atmospheric composition, Ammonia, Rainwater analysis.**—*M.R.*

2.4–49 551.510.41:551

Tatel, H. E., **Argon^{40} and the age of the earth.** *Journal of Geophysical Research*, 55(3):329–336, Sept. **1950.** 2 tables, 8 refs., 7 equations. **MH-BH**—Assuming that all A^{40} is derived from disintegration of K^{40} and it is all in the atmosphere, the author calculates that it must have been formed mainly before the earth's crust solidified and the atmosphere must have existed for at least 5×10^8 years before the crust was formed. A tentative estimate for the age of the earth in $2.1–3.3\times10^9$ years (oldest known rocks 2.5×10^9 years by radioactive method). *Subject Headings:* **Atmospheric composition, Argon, Geochronology.**—*C.E.P.B.*

2.4–50 551.510.42:523.5:060

Krinov, E. L., **Vtoraia meteoritnaia konferentsiia.** [Second conference on meteorites.] *Priroda*, Moscow, 39(12):70–75, Dec. **1950.** ref. **DLC**—Excerpts from the report on the paper read by V. G. FESENKOV: ". . . it has been stated by him that the total mass of traces left in the lower strata of the atmosphere by the Sikhote-Alinskiĭ meteor amounted to no less than 200 tons." ". . . When the speed (of the fall of the meteor) is great, the meteor is totally pulverized in the atmosphere of the earth." *Subject Headings:* **Atmospheric pollution, Meteor explosions, Sikhote-Alinskiĭ Meteor, Siberia.**

2.4–51 551.510.42

*Schueneman, Jean J., **A report of the atmospheric concentrations of sulfur dioxide in St. Louis—1950.** St. Louis, Div. of Health, Industrial Hygiene Section, [Oct. 26, 1950]. [22] leaves. figs., tables. Mimeographed. **DWB**—Analysis of air for SO_2 concentration at 14 places in various parts of St. Louis was conducted in 1950 and compared with results of a similar survey made in 1936–37. A marked decrease is noted, indicating that the area of greatest concentration (downtown) now has less SO_2 than area far out in the country did 14 years ago. Charts and tables show local, diurnal and seasonal variations; effect of wind direction and speed; and relationship to humidity, visibility and smoke. *Subject Headings:* **Atmospheric pollution, Sulfur dioxide, St. Louis.**—*M.R.*

2.4–52 551.510.42

Woodcock, Alfred H., **Sea salt in a tropical storm.** *Journal of Meteorology*, 7(6):397–401, Dec. **1950.** 4 figs., 2 tables, 6 refs. **MH-BH**—Air-borne sea salt in a tropical storm was sampled at Pompano, Florida. The method of sampling is described and the sea salt per cubic centimeter of air was measured by titration and the isopiestic method. The atmospheric sea salt determinations by these methods are similar in magnitude. The weight and number distribution of sea salt nuclei resembles that found in the same area during moderate winds. The hygroscopic properties of sea salt nuclei are discussed. The weight of water condensed in the nuclei can be determined by the equation $W_w = W_s(C^{-1}-1)$, where W_w is weight of water present, W_s is weight of sea salt and C is concentration of sea salt by weight fraction. The increase in air temperature is determined by the equation $\Delta T = W_w L_{Cp}$ where ΔT is increase in air temperature, L heat of vaporization of water and Cp is specific heat of moist air. Significant amounts of latent heat were released below 100 percent relative humidity. *Subject Headings:* **Saline nuclei, Hurricanes, Florida.**—*I.L.D.*

2.4–53 551.510.53:523.59

†Fesenkov, V. G., **O gazovom khvoste zemli.** [The gaseous protuberance of the earth's atmosphere.] *Priroda*, Moscow, 39(11):5–10, Nov. **1950.** 17 refs. **DLC**—The author describes phenomena, recently observed by him and his collaborators at the Mountain Astrophysical Observatory (in the vicinity of Alma Ata), designated as "Zodiacal twilight" (distorted zodiacal light) and "Pseudo Zodiacal light" (distorted counterglow). An explanation of these phenomena is seen in the shape of the terrestrial atmosphere which, contrary to prevalent

opinion, is not spherical but which forms in the plane of the terrestrial orbit a protuberance with a direction opposite to the sun. The history of research on zodiacal light by the author (since 1914) and others (1790–1950) is briefly discussed. *Subject Headings:* **Zodiacal light, Exosphere.**—*C.K.*

2.4–54 551.510.534(03)

Penndorf, Rudolf, **Proposals for unification of principal terms in research on atmospheric ozone.** *Journal of Geophysical Research*, 54(2):169–172, June **1949.** 2 tables, equations. **MH-BH**—Definitions of the terms used in atmospheric research, their symbols and the various constants are presented. The names of the defined quantities for ozone units are given in English, German and French. Conversion factors for the various units are given. *Subject Headings:* **Ozone, Glossaries.**—*I.L.D.*

2.4–55 551.510.534:523.38

Penndorf, Rudolf, **Über die Ermittlung der vertikalen Ozonverteilung bei Mondfinsternissen.** [Determination of the vertical ozone distribution during lunar eclipses.] *Leipzig, Universität, Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 15:171–178, **1949.** 2 figs., table, 8 refs., 2 equations. **DWB**—The vertical distribution of ozone in the earth's atmosphere from 5 to 50 km. is presented and discussed. Measurements of the intensity of sunlight reflected from the moon, just before a lunar eclipse and in the edges of the shadow, show the amount of absorption of certain wave lengths due to ozone in the earth's atmosphere at certain heights. Curves of Götz showing single and double max. compared with author's measurements for 40–50 km. *Subject Headings:* **Ozone layer, Lunar eclipses.**—*M.R.*

2.4–56 551.510.534

Regener, E., Paetzold, H. K. and Pfotzar, G., **Weitere Bestimmung der vertikalen Ozonverteilung.** [Further determination of the vertical distribution of ozone.] *Die Naturwissenschaften*, 37(24):559–560, Dec. **1950. DLC**—Ozone distribution up to 30 km. as determined from a spectrograph made during a free balloon ascent at Weissenau on Feb. 18, 1950 is compared with earlier ascent on June 26, 1934 at Stuttgart. A sharp max. appears at 22 km. and 18 km. respectively, on these two ascents. Agrees with V-2 ascents in the United States. *Subject Heading:* **Ozone distribution.**—*M.R.*

UPPER ATMOSPHERE—IONOSPHERE

2.4–57 551.510.535

Banerjee, S. S. and Mehrotra, R. R., **Multiple reflections and undulations in the F_2-region of the ionosphere.** *Science and Culture*, 16(2):72–73, Aug. **1950.** 3 figs., 3 refs. **MH-BH**—The anomalous behavior of the amplitude of multiple reflected pulses from the F2 region was found to occur even when the transmitter and receiver were situated very close to each other. Photographs of observations, showing the amplitude of higher order echoes to be higher than that of lower order echoes, are presented and analyzed. It is suggested that the anomalous variations in intensity of the reflected waves from the ionosphere are produced by undulations in the lower structure of the F2 region. *Subject Headings:* **Ionosphere, F2 layer.**—*I.L.D.*

2.4–58 551.510.535

Eyfrig, R., Harnischmacher, E. and Rawer, K., **World-wide *F2* ionization.** *Journal of Geophysical Research*, 55(3):261–266, Sept. **1950.** 7 figs., 7 refs. **MH-BH**—Midnight critical frequencies of F2 layer show a drop at the magnetic equator in equinox but no similar effect was found in height distribution of ionization. The diurnal variation of critical frequencies is examined in the Far East; max. are symmetric about magnetic equator, but min. show solar effects also. Structure is much more complex at spot max. than at spot min. *Subject Headings:* **F2 layer, Ionization.**—*C.E.P.B.*

2.4–59 551.510.535

Grace, Clinton H., **Conference on ionospheric physics.** *Science*, 112(2918):661, Dec. 1, **1950. DLC**—Brief account of conference at Pennsylvania State College July 24–27, 1950.

Papers by S. K. Mitra, L. Harang, S. Chapman, K. Weekes (ionospheric winds), etc. and symposia. *Subject Heading:* **Ionospheric research.**—*C.E.P.B.*

2.4–60 551.510.535:551.590.21

Israël, Hans, **Sonne und Erde.** [Sun and earth.] *Naturwissenschaftliche Rundschau*, 3(3):101–106, March **1950.** 8 figs. **DWB**—The source of solar energy, its effect on the upper atmosphere and on radio transmission and the possible relationship between sunspots and weather are discussed and illustrated. The spectral distribution of energy at different heights, ionization in different regions of the ionosphere and the relation of sunspots to rainfall, tree rings and the height of Lake Victoria are among the illustrations presented. *Subject Headings:* **Upper atmosphere, Ionosphere, Solar influences.**—*M.R.*

2.4–61 551.510.535

Lung, H. L., **Seasonal variation of world-wide F2 ionization for noon and midnight hours.** *Journal of Geophysical Research*, 54(2):177–179, June **1949.** 3 figs., 3 refs. **MH-BH**—A study of the F2 ionization for each month during 1946 and 1947 indicated that for the noon curve there is a distinct dip of the critical frequencies at the geomagnetic equator with a max. at each side. Between 45° and 55° geomagnetic latitude the noon curve has another max. in the Northern Hemisphere. The midnight curves show only one max. of the critical frequency shift and they follow the solar declination. Since the shift of the max. in the midnight curves follows the solar angle it provides a better criterion for studying the F2 seasonal variation than noon-hour values. *Subject Headings:* **F2 layer, Ionization.**—*I.L.D.*

2.4–62 551.510.535

McNish, A. G. and Gautier, T. N., **Theory of lunar effects and midday decrease in F2 ion-density at Huancayo, Peru.** *Journal of Geophysical Research*, 54(2):181–185, June **1949.** 2 figs., 5 refs., equations. **MH-BH**—The diurnal variations in the F2 layer at Huancayo, Peru, showed a secondary min. around noon and a secondary max. in the late afternoon instead of a max. in the early or late afternoon. The equation, giving the relationship between diurnal variations in the earth's magnetic field and forced diffusion of ions in the F2 region, is developed. Calculations indicate that the forced diffusion of ions, produced by diurnal variations in the earth's magnetic field, may be the cause of the midday decrease in F2 critical frequency observed at Huancayo. This theory is corroborated by the fact that the noon values of F2 critical frequency are lower when the solar and lunar magnetic diurnal variations are in phase than when they are out of phase. *Subject Headings:* **F2 layer, Ionization, Peru.**—*I.L.D.*

2.4–63 551.510.535:550.385

Maire, J., **Note sur les relations entre l'agitation du champ magnétique terrestre et l'agitation ionosphérique observée dans les radiocommunications transcontinentales par ondes décamétriques.** [Note on the relation between the disturbance in the terrestrial magnetic field and ionospheric disturbance observed in transcontinental radiocommunication by 10 m. waves.] *Annales de Géophysique*, 5(3):216–220, July–Sept. **1949.** 3 figs., table, 6 refs. **MH-BH**—The author describes a method of recording daily ionospheric disturbances over a given distance as reflected in radio communication, and discusses that variation of the amplitude of the ionospheric disturbances as a function of distance, the 27–28 day cycle of ionospheric disturbances and the concomitant disturbances of the earth's magnetic field. *Subject Headings:* **Ionospheric disturbances, Terrestrial magnetism, Radio transmission.**—*I.L.D.*

2.4–64 551.510.535:523.2

Moore, H. S. and Stein, M., **Comparison of variously derived solar indexes.** *Journal of Geophysical Research*, 55(4):423–425, Dec. **1950.** 2 tables, 2 refs. **MH-BH**—The relative merits of ionospheric solar indexes (that is an index of solar activity based upon ionospheric measurements) obtained from: 1) 27-day and monthly values of f°F2 and 2) f°F2 from one representative ionospheric station and from a mean of three such stations were tested by the following criteria; (a) magnitude of standard deviations of the solar indexes from their running mean and (b) the degree of correlation with f°F2 from other stations not providing data from

which ionospheric solar indexes were derived. With respect to the standard deviation from the running mean, no significant difference was found between the merits of solar indexes derived from 27-day or monthly medians of $f°F2$. The solar indexes derived from a three-station average gave a better correlation with $f°F2$ of other stations than those obtained by using Washington data alone. *Subject Headings:* **Solar activity, F2 layer, Ionosphere.**—*From author's abstract.*

2.4–65 551.510.535:523.78

Savitt, Jacob, **Recombination and attachment in the F-region during the eclipse of May 20, 1947.** *Journal of Geophysical Research*, 55(4):385–394, Dec. 1950. 7 figs., table, 11 refs., 10 equations. **MH-BH**—The variations of electron density at fixed real heights in the F2 region of the ionosphere, during the solar eclipse of May 20, 1947, were compared with theoretical values expected under alternative assumptions that the electrons disappear either by recombination with positive ions or by attachment to neutral particles. The equations, describing the recombination and attachment processes, are developed and their application to the observational data is presented. The recombination and attachment coefficients, calculated by these equations, vary systematically with height and are of the same order of magnitude as those determined by other investigations. The best agreement between observed data and theoretical calculations is obtained at the 260 km. level on the assumption that variations in electron density depend upon the attachment process. *Subject Headings:* **F layer, Electron density, Solar eclipses.**—*I.L.D.*

2.4–66 551.510.535:551.590.22

Tschu, K. K., **On the practical determination of lunar and luni-solar daily variations in certain geophysical data.** *Australian Journal of Scientific Research, Ser. A, Physical Sciences*, 2(1):1–24, March 1949. 7 figs., 6 tables, 15 refs., 31 equations. **MH-BH**—Based on the Chapman-Miller method of determining lunar tides in atmospheric or ionospheric phenomena, a detailed set of instructions and computation tables have been prepared which can be used with cards (tables) or punched card machines. Theory and development of tables and charts explained at length. Use for calculating daily or semi-diurnal effects on atmospheric pressure, temperature, wind, magnetic and electrical properties of upper atmosphere is illustrated. *Subject Headings:* **Lunar variations, Ionosphere computation tables, Machine methods.**—*M.R.*

2.4–67 551.510.535:551.594.7

Warmbt, W., **Atmosphärische Störungen auf Kurzwelle 9 MHz im Zusammenhang mit der Gewitterhäufigkeit.** [Atmospheric disturbances on the short wave 9 MHz in connection with thunderstorm frequency.] *Leipzig, Universität, Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 15:228–240, 1949. 5 figs., 9 refs. **DWB**—A general treatment of various kinds of disturbances in short-wave transmission with particular emphasis on relation between ionospheric disturbances and interference with propagation. Reception records made during the summer of 1944 are compared with frequency of thunderstorms reported in the German network. *Subject Headings:* **Ionospheric disturbances, Sferics, Thunderstorms, Germany.**—*M.R.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

2.4–68 551.511

Koo, Chen-chao, **Pressure flow of a turbulent fluid in channels.** *Meteorological Magazine, Nanking*, 19(1–4):63–69, Aug. 1947. 2 figs., 2 tables, 6 refs., 5 equations. In Chinese, English summary p. 63. **MH-BH**—The distribution of velocities in a wind channel is calculated from MONTGOMERY's assumption for mixing length. The calculated distribution agrees with observations. *Subject Headings:* **Turbulent flow, Mixing length.**—*C.E.P.B.*

2.4–69 551.511:551.553.11

Merbt, H., **Vereinfachte Theorie der örtlich und zeitlich veränderlichen atmosphärischen Reibungsschichten.** [Simplified theory of the variable (in space and time) air friction layers.] *Leipzig, Universität, Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 15:138–146, 1949. 3 figs., 3 refs., 27 equations. **DWB**—Roux's (1935) boundary layer theory is extended to the

non-stationary base. Graphs are compiled showing the height, variations and deviations for a frictional layer changing in time, for one changing in space and for a stationary layer assuming a frictionless, gradient wind moving from a smooth sea to a rough, flat coast. *Subject Headings:* **Gradient winds, Land and sea breezes, Mechanics of the atmosphere.**—*M.R.*

2.4–70 551.511:517.512.2

Nitsche, H., **Bemerkungen über den Zusammenhang zwischen Druck und Temperatur am Beispiel der 18 tägigen Welle im Frühsommer 1947.** [Remarks on the relation between pressure and temperature as shown by a case of an 18-day wave in the early summer of 1947.] *Leipzig, Universität, Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 15:159–170, **1949.** 7 figs., 5 refs. **DWB**—Records for central Europe are analyzed for the period from May 2 to July 12, 1947. Charts show progress of waves of surface pressure, absolute topography, temperature, closed isobars, isohypses and isotherms across Europe and the daily march of pressure and temperature at Leipzig and Budapest. *Subject Headings:* **Weather cycles, Periodicities, Central Europe.**—*M.R.*

2.4–71 551.511:551.524.4

Ogiwara, S., **The vertical transfer of heat and the change of air temperature by turbulence.** *Meteorological Society of Japan, Journal, 2nd Ser.*, 28(2):66–70, Feb. **1950.** fig., table, 2 refs., 15 equations. In Japanese, English summary p. 70. **DWB**—Extending G. I. Taylor's formula, author obtains an expression of the vertical transfer of heat and change of air temperature, taking the transfer of air mass into account. Assuming $K = 10^5$, this gives better agreement than Taylor's formula with observations of the diurnal variation of temperature up to 2 km. above Lindenberg. *Subject Headings:* **Energy exchange, Turbulence, Temperature variations, Lindenberg Observatory, Berlin.**—*C.E.P.B.*

GENERAL CIRCULATION

2.4–72 551.513

Arakawa, H., **Potential shear: A suggested conservative property in equatorial meteorology.** *Journal of Meteorology*, 7(6):404, Dec. **1950.** 2 equations. **MH-BH**—On the assumption that the atmosphere is quasi-barotropic the author shows mathematically, by means of the equations of motion and of continuity, that if air is brought to a standard density by ascending or descending motion the resulting shear may be regarded as a characteristic conservative property which may be termed "potential shear." *Subject Headings:* **General circulation, Shear, Equatorial meteorology.**—*M.R.*

2.4–73 551.513

Bouman, D. J., **Golven van Helmholtz in de atmosfeer.** [Helmholtz waves in the atmosphere.] *Nederlands Tijdschrift voor Natuurkunde*, 16(11):263–274, Nov. **1950.** 24 refs., 12 equations. Discussions by the author, P. Groen and H. Bremmer p. 272–274. **DLC**—The theory of Helmholtz waves is outlined and application is made to direction and speed of propagation in the atmosphere and to forecasting of sea waves. Finally, the controversy over the theories of *Bénard cells* and *Helmholtz waves* is discussed at some length. *Subject Heading:* **Helmholtz waves.**—*M.R.*

2.4–74 551.513

§Hsieh, Yi-ping, **On the formation of shear lines in the upper atmosphere.** *Journal of Meteorology*, 7(6):382–387, Dec. **1950.** 9 figs., 4 refs. **MH-BH**—The author discusses the vertical circulation and changes of atmospheric structure involved in the formation of a shear line in the upper atmosphere and compares these processes with those occurring during the formation of upper cut off lows. A specific case of upper shear line formation is analyzed synoptically and the levels at which convergence and divergence occur in the trough are determined. It is proposed that the formation of an upper atmosphere shear line requires the existence of a direct solenoidal circulation in the cold trough and that this direct circulation be strong along the sides and weak at the tip of the cold trough, so that the cold trough region can change into a narrow strip. *Subject Headings:* **General circulation, Shear lines.**—*I.L.D.*

2.4–75 551.513:551.558

Tschu, Kwang-kun, **On the energy-transport of the macroscopic turbulence in the Far East.** *Meteorological Magazine, Nanking*, 19(1–4):20–27, Aug. **1947.** fig., 6 tables, 8 refs. In Chinese, English summary p. 20. **MH-BH**—Continuation of paper published in 1944. Discusses transport of heat and energy. Heat transport averages 0.58 cal./cm²/sec. in winter W of N, in summer N of E. Heat transfer vectors and heat balance are shown for each 5° square. Mean transport of momentum 2.52 $\times 10^3$ dyn/cm². Energy dissipation is also shown for 5° squares, positive in frontal regions and typhoon zone. *Subject Headings:* **Energy transport, Atmospheric circulation, Far East.**—*C.E.P.B.*

2.4–76 551.513.1

§Jaw, Jeou-jang, **The formation of the semipermanent centers of action in relation to the horizontal solenoidal field.** *Meteorological Magazine, Nanking*, 19(1–4):1–13, Aug. **1947.** 2 figs., 13 refs., 45 equations. In Chinese, English summary p. 1. **MH-BH**—The circulation in the middle cell of the general circulation in a baroclinic atmosphere, including a horizontal solenoid, is investigated. A critical wave length is found beyond which a perturbation becomes unstable and this partly explains the flow pattern during weak circulation and also during large scale mixing. Coincidence of isobars and isotherms eliminates the horizontal solenoid and gives a stationary wave length. An inter-relation between meridional and zonal circulation is established. *Subject Headings:* **Centers of action, Atmospheric circulation.**—*C.E.P.B.*

ATMOSPHERIC DISTURBANCES

2.4–77 551.515:551.461.2(484.9)

*§Corkan, R. H., **The levels in the North Sea associated with the storm disturbance of 8 January 1949.** *Royal Society of London, Philosophical Transactions, Ser. A, Mathematical and Physical Sciences*, 242(853):493–525, July 4, **1950.** 10 figs., 6 tables, 10 refs., equations. **DWB**—A study of water movements in the North Sea and the way in which they were produced during a storm on Jan. 8, 1949. Observations on hourly heights of tides were made at stations in Great Britain and in the North Sea from Jan. 6 to 10, 1949. Data are presented on hourly values of sea level disturbances, max. disturbances around the English coast and in the Thames and Humber estuaries, progression of max. disturbance and of the diurnal tide, meteorological conditions over England and the North Sea during the storm and changes in average levels over the North Sea. Maps of isopleths of equal number of disturbances in the North Sea have been drawn and compared with simultaneous meteorological conditions. Estimates of frictional constant have been made. It is concluded that storm surges of external origin, which could not be explained by wind action, may be the direct result of a previous outflow of water from the North Sea produced during a surge when the sea level was lowered, and that the damping observed in disturbed tide at Southend may be due to a reflection from the German bight which arrives near the time when lowest levels are expected. *Subject Headings:* **Storm tides, North Sea, England.**—*I.L.D.*

2.4–78 551.515.2:551.521.13(729)

Abbot, Charles Greeley, **Solar variation attending West Indian hurricanes.** *Smithsonian Miscellaneous Collections*, 110(1), April 20, **1948.** 7 p. fig., 3 tables, 13 refs. **MH-BH**—Values of solar constant were tabulated from 10 days before to 12 days after dates when 63 hurricanes were first reported. Full table given. The averages show a gradual decrease in first 10 days and then a sharp min. on actual day, recovering on third following day. *Subject Headings:* **Hurricanes, Solar constant variations, West Indies.**—*C.E.P.B.*

2.4–79 551.515.2:551.513.3(54)

Chakravortty, K. C., **Characteristics of calm centres of some cyclonic storms which formed in the Bay of Bengal and passed over Calcutta and Saugor Island.** *Indian Journal of Meteorology and Geophysics*, 1(3):252–256, July **1950.** 5 figs., table, 3 refs. **MH-BH**—The author describes the wind, pressure, temperature, humidity, cloudiness and precipitation characterizing cyclonic storms passing over Alipore (Calcutta) and Saugor Island from January 1934 to August 1941. The present study indicates that even on reaching the mainland, and

after considerable weakening, some of the storms manifested the characteristics of calm centers observed in tropical cyclones. *Subject Headings:* **Cyclone structure, Hurricanes, India.**—*I.L.D.*

2.4–80 551.515.2(759)

§**Florida hurricane of October 17–18, 1950.** *Weatherwise*, 3(6):136–137, Dec. **1950.** 2 figs., photo. **MH-BH**—The most violent hurricane to hit Miami since 1926 is described and copies of weather charts and barograph trace (lowest pressure 28.25 inches—956.7 mb.) are reproduced. Heavy damage was confined to a small area. Jacksonville reported 11.73 inches of rain. Gusts 150 m.p.h. were reported (122 m.p.h. for 1 minute and 97 for 5 min.). *Subject Headings:* **Hurricanes, Florida.**—*M.R.*

2.4–81 551.515.2(52):551.577.37(52)

Fukuda, K., **On the relation between the path of typhoon and the heavy rainfall in Tohoku District.** *Journal of Meteorological Research*, Tokyo, Vol. 2, Suppl.No. p. 9–29, Aug. **1950.** figs., tables. In Japanese, English summary p. 108. **DWB**—Typhoons are classified according to their tracks (12 types) and the origin and distribution of heavy rains in the Tohoku District tabulated for each. Two types of track are found, one crossing Tohoku and the other proceeding north off Sanriku. Most of the paper consists of a list of typhoons giving rains exceeding 50 and 100 mm. *Subject Headings:* **Typhoons, Excessive precipitation, Tohoku District, Japan.**—*C.E.P.B.*

2.4–82 551.515.2(52):551.577.37(52)

Noguchi, L., **On the heavy rain caused by typhoon in Tohoku District.** *Journal of Meteorological Research*, Tokyo, Vol. 2, Suppl.No. p. 29–34, Aug. **1950.** 12 charts. In Japanese, English summary p. 108. **DWB**—Typhoons along the same track sometimes bring heavy rain to Tohoku, sometimes not. The cause of this is investigated synoptically. Heavy rainfall depends on convergence of the warm air in front of the typhoon as well as convergence in its center; the development of the Okhotsk Sea and mid-latitude anticyclones are also important. *Subject Headings:* **Typhoons, Excessive precipitation, Tohoku District, Japan.**—*C.E.P.B.*

2.4–83 551.515.2

Riehl, Herbert, **A model of hurricane formation.** *Journal of Applied Physics*, 21(9):917–925, Sept. **1950.** 10 figs., table, 10 refs., 4 equations. Reprint available. **DLC**—Thermal circulation of a mature hurricane is discussed with aid of tephigrams showing how warm, moist air is brought in at low levels and withdrawn at about 200 mb. (open system). Former theories of origin of hurricanes fail because they are concerned mainly with low level convergence and do not supply compensating high level outflow. Author follows SAWYER in starting with high level divergence, but provides energy of maintenance from vertical circulation over a very wide area. The cyclonic vortex is situated entirely in warm air. *Subject Heading:* **Hurricane formation.**—*C.E.P.B.*

2.4–84 551.515.2:551.501.8

§Rodewald, M., **Neue Einblicke in die Taifune.** [New views concerning typhoons.] *Die Naturwissenschaften*, 37(22):518–522, Nov. **1950.** 9 figs., 37 refs. **DWB**—A brief report listing new and unusual opinions advanced by meteorologists throughout the world regarding typhoon characteristics and typhoon analysis—conclusions made possible largely through the analysis of radar, radiosonde and aircraft data obtained in recent years. Illustrative charts are included. *Subject Headings:* **Typhoons, Upper air analysis.**—*R.S.Q.*

2.4–85 551.515.2(969)

Simpson, R. H., **Hiki—Hawaii's first hurricane of record.** *Weatherwise*, 3(6):127–128, Dec. **1950. MH-BH**—Path of phenomenal hurricane of August 13–30, 1950 shown on chart. Storm was stalled in the vicinity of Hawaiian Islands from Aug. 15–18, then moved WNW. Eye of storm penetrated twice—found to be 20–25 miles in diameter. Winds reached 90+ m.p.h. *Subject Headings:* **Hurricanes, Hawaiian Islands.**—*M.R.*

2.4–86 551.515.2:629.13(729)

Thompson, Wilmer L., **In the eye of a hurricane.** *Weatherwise*, 3(6):122, Dec. **1950. MH-BH**—Eye witness account of weather and sea condition in eye of hurricane which appeared south of Cuba on Oct. 16, 1950. Airplane was in eye for 21 minutes. *Subject Headings:* **Hurricane structure, Airplane weather reconnaissance, West Indies.**—*M.R.*

2.4–87 551.515.227:551.509.31(52)

Okubo, A. and Nakamura, N., **Cold stratosphere accompanying a typhoon.** *Meteorological Society of Japan, Journal, 2nd Ser.*, 28(4):107–112, April **1950.** 4 figs., 3 tables. In Japanese, English summary p. 112. **MH-BH**—A very cold stratosphere (below −70°C.) is often found in front of typhoons, probably brought from equatorial regions. A typhoon tends to move along a cold trough towards this cold tip and recurves or fills up if warm air invades it. When the stratosphere is above −60°C. typhoons will not occur in Japan. *Subject Headings:* **Typhoon formation, Typhoon forecasting, Japan.**—*C.E.P.B.*

2.4–88 551.515.23(52)

Matsukura, H., **A study of the movement of typhoon.** *Journal of Meteorological Research*, Tokyo, Vol. 2, Suppl.No. p. 51–54, Aug. **1950.** fig., 18 charts. In Japanese, English summary p. 108. **DWB**—Paths of successive typhoons are often similar. They tend to move towards negative pressure anomalies (15-day mean) and to avoid Japan when it is covered by a region of positive anomaly. *Subject Headings:* **Typhoon tracks, Japan.**—*C.E.P.B.*

2.4–89 551.515.4(57)

Chistiakov, V. F., Petrovskiĭ, B. I. and Korsunskaia, G. V., **Sluchaĭ groz v kholodnoe vremia goda.** [Thunderstorms during the winter.] *Priroda*, Moscow, 39(11):49–50, Nov. **1950. DLC**—Reports on thunderstorms at unusual times of the year: Kaliningrad on Nov. 10, 1948, Jan. 21, 1949 and March 15, 1950; Monchegorsk (Kola Peninsula) on May 17, 1950; Vladivostok region in Dec. 1949 during a blizzard. Such winter thunderstorms are not uncommon in coastal regions, but are very rare in continental or Arctic localities such as the above. *Subject Headings:* **Winter thunderstorms, U.S.S.R.**—*C. K.*

2.4–90 551.515.7:551.515.1(73)

§Di Benedetto, Felice, **Un paradosso apparente: circolazione ciclonica nella zona centrale di anticicloni in quota dell'emisfero nord.** [An apparent paradox: cyclonic circulation in the central zone of an anticyclone aloft in the Northern Hemisphere.] *Rivista di Meteorologia Aeronautica*, 10(2):34–36, April–June **1950.** 3 figs., 3 refs. **MH-BH**—A brief, illustrated discussion and explanation of two cases of cyclonic circulation in the center of an upper anticyclone over the United States. *Subject Headings:* **Upper anticyclones, Cyclogenesis, United States.**—*M.R.*

RADIATION AND TEMPERATURE

RADIATION

2.4–91 551.521

*Stranz, D., **Strahlungsmessungen am Geophysikalischen Observatorium Collm.** [Radiation measurements at Collm Geophysical Observatory.] *Leipzig, Universität, Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 15:207–227, **1949.** 2 figs., table, 5 refs. **DWB**—Radiation measurements have been made at Collm since 1935 by LETTAU and the author. Measurements from 1935 to 1943 inclusive were destroyed during the war. Instruments used and corrections, computations, etc. are described in detail. Actual observations and calculated data made on various dates from July 1944 to April 1945 are listed in a 10 page table. *Subject Headings:* **Radiation measurements, Nomograms, Collm Observatory, Leipzig.**—*M.R.*

2.4–92 551.521.1:591.5

Dinesman, L. G., **O rasprostranenii i ekologii reptiliĭ v sviazi s zonami solnechnoĭ radiatsii.** [The relationship between the distribution and ecology of reptilia and zones of solar radiation.] *Problemy Fizicheskoĭ Geografii*, 14:153–165, **1949.** 4 tables, 10 refs. **DLC**—The

geographical distribution of snakes and lizards inhabiting the plains of the U.S.S.R. is positively correlated with the zones of solar radiation as defined by A. A. GRIGOR'EV. Most of the genera and species are found in zones characterized by the summer tropical, the transitional zone from summer tropical to spring tropical and spring tropical radiation zones. Tables illustrate the relationship between reptilia and vegetation zones and solar radiation zones. The adaptation of snakes and lizards to the radiational characteristics of their habitats is reflected in the degree of pigmentation of the peritoneum which increases with increasing radiational effectiveness. Data are presented on the relationship between body temperature of lizards and solar radiation zones; body temperature increases with increasing effective solar radiation. *Subject Headings:* **Solar radiation, Animal ecology, Reptiles.**—*I.L.D.*

2.4–93 551.521.1 551.521.63 551.510.4

*Rodionov, S., Pavlova, E., and Stupnikov, N., **Izmerenie korotkovolnovogo kontsa solnechnogo spektra metodom shchetchika sveta.** [On the measurement of the short-wave end of the solar spectrum by means of the light counter.] (In Trudy Elbrusskoĭ Ekspeditsii Akademii Nauk, SSSR, i Vsesoiuznogo Instituta Eksperimental'noĭ Meditsiny 1934 i 1935. [Reports of the Elbrus Expedition 1934 and 1935.] Moscow, **1936.** p. 61–88. 27 figs., 3 tables, 13 refs., 13 equations. English summary p. 88–89. [*Akademiia Nauk, SSSR, Komissiia po izucheniiu stratosfery*, Tom II.]) **DLC**—Experimental data are presented in graphic form to show systematically the results of optical measurements of ultraviolet band in the solar spectrum during 1933 and 1934 at 2260, 3000 and 4250 m. elevations on Mount Elbrus in the Caucasus. Diurnal variations in the region 2700 to 3100 Å indicated that at lower elevations the curve is normal but at 3000 and 4250 m. there is evidence of the presence of anomalous bands at 2600 Å and an anomalous max. during the morning hours in the ordinary bands. The thickness of the ozone layer in the atmosphere was calculated from the spectral energy curve according to the Lambert-Bouguet method using α of Fabry and Buisson. Although results are in agreement with theory; evidence of certain anomalous conditions must be accepted with reservation. *Subject Headings:* **Solar radiation, Ultraviolet spectrum, Ozone measurements, Elbrus Expedition, U.S.S.R.**—*M.R.*

2.4–94 551.521.1:67

*Trombe, Félix, Foëx, Marc and Henry La Blanchetais, Mlle. Charlotte, **Utilisation de l'énergie solaire.** [Utilization of solar energy.] *France, Centre National de la Recherche Scientifique, Journal des Recherches*, 2(4–5):61–89, **1948.** 35 figs., 9 tables, 12 refs. **MH-BH**—The authors summarize early attempts made by BUFFON, CASSINI, TSCHIRNHAUSEN, LAVOISIER and MOUCHOT to utilize solar radiation for producing high temperature. Table of intensity of direct solar radiation at Sainte-Maur at the middle of each month and maps showing total number of sunshine hours per year in France and monthly duration of insolation for January, April, July and October are presented. The theoretical temperature attainable by concentrating the sun's rays and the efficiency of mirrors are discussed. The authors describe the construction and operation of the solar furnace at Meudon, which is illustrated with diagrams and photographs. Temperatures as high as 3300°C. have been obtained. This furnace has been used successfully in melting ThO_2, ZrO_2, MgO, TiO_2, Al_2O_3, etc.; in melting chromium; in producing ammonic and nitric acid directly from their constituents and in the continuous treatment of refractory substances to prepare melted specimens of appreciable size. *Subject Headings:* **Solar radiation, Solar furnaces, Industrial meteorology, France.**—*I.L.D.*

2.4–95 551.521.1:523.78

Yamamoto, G., Yamamoto, S. and Sato, B., **Observations of solar and sky radiation. A. The observation of the total solar radiation.** In: Report of solar eclipse observation May 9, 1948. *Geophysical Magazine, Tokyo*, 19(3–4):66–72, Dec. **1949.** 3 figs., 4 tables, 2 refs. In English. **MH-BH**—The intensity of solar radiation during the eclipse of May 9, 1948 was measured with Moll-Gorczyński type actinometers and it was recorded by Yokokawa's moving coil galvanometer. Data on the intensity of solar radiation during time of eclipse are given. The limb darkening of the solar disc was investigated by the method used by W. H. JULIUS. The radiation at various distances from center of solar disc was calculated and a curve resembling that obtained by W. H. JULIUS in 1912 is given. *Subject Headings:* **Solar radiation, Solar eclipses, Japan.**—*I.L.D.*

2.4–96 551.521.3:551.571

Aldrich, L. B., **Note on Fowle's spectroscopic method for the determination of aqueous vapor in the atmosphere.** *Smithsonian Miscellaneous Collections*, 111(12), Sept. 20, 1949. 6 p. 2 figs., plate, 2 tables, 2 refs. **MH-BH**—Investigations at Miami gave an opportunity to check Fowle's 1912 curve of precipitable water in the atmosphere. The set-up is described and representative bolographs reproduced. Fowle's curve was found to be substantially correct. *Subject Headings:* **Water vapor measurements, Bolometers.**—*C.E.P.B.*

2.4–97 551.521.63:523.78

Miyake, Y. and Saruhashi, K., **The variation of the ultraviolet solar radiation during the eclipse.** *Geophysical Magazine, Tokyo*, 22(1):5–9, Oct. 1950. 4 figs., table, 6 refs., equations. In English. **MH-BH**—A brief summary of observations of UV intensity during solar eclipse on May 9, 1947 (sic) at Tokyo. Twelve readings were made from 9 A.M. to 1:10 P.M. (seven between 11 and 12). The limb darkening effect is treated in more detail. Lowest intensity was 20% of maximum at 11:34, when 26% of sun was exposed. *Subject Headings:* **Ultraviolet light, Solar eclipses, Tokyo.**—*M.R.*

2.4–98 551.521.63

*Sekihara, K. and Kawamura, K., **A study of the distribution of ultraviolet sky radiation.** *Geophysical Magazine, Tokyo*, 22(1):21–28, Oct. 1950. 8 figs., 6 tables, 5 refs., 3 equations. In English. **MH-BH**—Observations were made at Rebun Island to show the angular distribution of UV radiation from the sky during the solar eclipse on May 9, 1948. It was concluded that the intensity in the vicinity of the zenith depends chiefly on the first order scattering when the solar altitude is about 60°. Inversion near zenith is due to lunar shadow. Accuracy of measurements with a photoelectric tube with a wide aperture discussed and illustrated. *Subject Headings:* **Ultraviolet light, Solar eclipses, Rebun Island, Japan.**—*M.R.*

2.4–99 551.521.63:523.78

Miyake, Y., Sekihara, K. and Kawamura, K., **Observations of solar and sky radiation. B. Results of the observation of intensity and distribution of ultra-violet sky radiation at Rebun Island.** In: Report of solar eclipse observation, May 9, 1948. *Geophysical Magazine, Tokyo*, 19(3–4):72–77, Dec. 1949. 7 figs. In English. **MH-BH**—The ultraviolet sky radiation on the day of the eclipse was studied by means of photoelectric cells sensitive in the region of 3000–3200 Å. The apparatus is illustrated by means of circuit diagrams and the procedure is described. Schematic diagrams of the distribution of intensity are given. The min. point of brightness at about 90° from the sun, which was observed by O. Eckel, was noted. *Subject Headings:* **Ultraviolet light, Solar eclipses, Rebun Island, Japan.**—*I.L.D.*

TEMPERATURE

2.4–100 551.524.3

Kou, S. L., **Effective nocturnal radiation and the variation of the temperature near the ground surface.** *Meteorological Magazine, Nanking*, 19(1–4):14–19, Aug. 1947. 12 figs., 2 refs., 8 equations. In Chinese, English summary p. 14. **MH-BH**—A complex formula is derived which gives the decrease of temperature near the ground at night mainly in terms of nocturnal radiation and coefficient of turbulent exchange. *Subject Headings:* **Nocturnal cooling, Temperature variations.**—*C.E.P.B.*

2.4–101 551.524.32

*Gleeson, Thomas A., **A theory of annual temperature variations.** *Journal of Meteorology*, 7(6):351–362, Dec. 1950. 6 figs., 6 tables, list of symbols, 22 refs., 37 equations. **MH-BH**—Differential equations of heat flow, describing annual variations in potential temperature of the atmosphere and annual variations in the ground, are developed, and solutions are chosen containing constant amplitude terms. Two surface boundary conditions are postulated. In one, the temperature of the ground and the potential temperature of the air are equal at all times. In the other, the flux of energy across the surface air boundary is always continuous and its formulation requires a consideration of the total energy balance. The theoretical solutions are applied to clima tological data. The solution for the atmosphere yields a coeffi-

cient of vertical heat exchange that is constant with height and also gives close approximations to observed annual variations of potential temperature at three continental stations in the United States, Mexico and Canada. The theoretical annual temperature variations at various depths in the ground follows observed variations. Theoretical annual variations in the upper troposphere are not so accurate as those close to the surface, probably because of neglect of advection and of localized heating and cooling aloft. *Subject Heading:* **Temperature variations.** —*I.L.D.*

2.4–102 551.524.32:551.521.1

Koo, Chen-chao, **On relative amplitude and thermal quotient.** *Meteorological Magazine, Nanking*, 19(1–4):70–73, Aug. **1947.** 5 refs., equations. In Chinese, English summary p. 70. **MH-BH**—From MILANKOVICH's expansion of the equation for mean solar radiation, the annual range of temperature is proportional to sine latitude between latitudes 19° and 66½°. Only between these latitudes can the thermal quotient (range/sin. lat.) be regarded as a measure of the lag of temperature behind radiation. *Subject Headings:* **Solar radiation, Temperature variations, Thermodynamics of the atmosphere.**—*C.E.P.B.*

2.4–103 551.524.36:63:551.509.3(54)

Chakravortty, K. C., **Discussion on a method of predicting night minimum temperature in winter.** *India, Meteorological Dept., Scientific Notes*, 11(135):39–46, **1950.** 3 tables, 6 refs. **DWB**—Daily dry and wet bulb temperature and cloud and wind data, recorded at different synoptic hours between 1400 and 0800 hours Indian Standard Time during the winter months at New Delhi, Bareilly and Bamrauli, and the corresponding hourly current weather observations were analyzed. It was found that night minimum temperatures at these places could be forecast on the basis of their 1400 hour dry bulb temperature and dew point by means of the empirical formula $T_2=\frac{1}{2}(T'+D')-C$, provided the air mass had not changed between 1400 to 0500 hours in the following morning. T_2=night minimum temperature; T' and D'=dry bulb and dew point respectively; C=constant depending on the place, average low cloud amount at night and wind force at night. The value of the constant C for different combinations of cloudiness and wind speed has been calculated for these stations. The meteorological limitations of the formula are discussed. In actual trial at New Delhi the formula was successful in predicting minimum temperature within three degrees on 80% of the occasions. (This article referred to in a note in *Science and Culture*, 16(2):68, Aug. 1950.) *Subject Headings:* **Temperature forecasting, Agro-meteorological forecasting, India.**—*I.L.D.*

2.4–104 551.524.37

Fleagle, Robert G., **Air temperature modification by vertical transport.** *Journal of Applied Physics*, 21(4):326–328, April **1950.** 3 figs., table, 2 refs., 15 equations. **DLC**—The amount of energy necessary to heat surface air under conditions of strong nocturnal cooling is calculated for (a) direct heating of surface air and (b) forcing air from the inversion layer down to the surface through stacks by means of fans. Theoretical curves show the required energy to be a function of vertical air speed and compare the amount of power required by the two methods (a) and (b) under varying vertical temperature gradients and stack velocities. With strong inversions the power method (b) is shown to be more economical than the direct heating method (a). *Subject Headings:* **Frost prevention, Temperature control.**—*M.R.*

2.4–105 551.524.7

*Giraud, P., **Distribution de la température dans l'atmosphère libre.** [Temperature distribution in the free atmosphere.] *Journal Scientifique de la Météorologie*, 2(8):121–130, Oct.–Dec. **1950.** 2 tables, 3 refs. French, English and Spanish summaries p. 121. **MH-BH** —FLOHN (1947) showed that the mean temperature aloft varies considerably along a parallel of latitude at any given season. Average monthly temperatures from 0.5 to 16 km. are given for 4 stations along the 47th parallel and 5 stations along the 39th parallel. Differences between summer and winter, coastal and continental, west and east coast and western United States and Europe are shown in tables and explained. [Great Falls, which lies *east* of the Continental Divide (1000 km. from the Pacific), is used as a *coastal* station analogous to Brest. Climatically it is more like Prague than Brest.—(ed.)] *Subject Headings:* **Upper air temperatures, Tropopause.**—*M.R.*

ATMOSPHERIC PRESSURE AND WIND

PRESSURE

2.4–106 551.543:551.461

Unoki, Sanae, **On the variation of sea level caused by the variation of atmospheric pressure.** *Oceanographical Magazine*, Tokyo, 2(1):1–15, March **1950.** 6 figs., 3 tables, 5 refs., 37 equations. In English. **DWB**—Author calculates the retardation of the oscillation of sea level due to a moving wave of barometric pressure assuming resistance proportional to velocity of fluid particles. The retardation increases with length and speed of surface pressure oscillation, decreases with increasing depth of ocean and increases with latitude; alignment of coast is also effective. Two cases are discussed in which the observed retardation was 4.2 and 1.5 hours compared with calculated values of 6.5 and 2.2. Effect of wind is not considered. *Subject Headings:* **Pressure variations, Sea level variations, Atmospheric tides, Japan.**—*C.E.P.B.*

2.4–107 551.543.2:551.521.1

Spar, Jerome, **Some possible effects of solar-radiation changes on the annual pressure oscillation.** *Journal of Meteorology*, 7(6):395–397, Dec. **1950.** 2 charts, 2 refs., 12 equations. **MH-BH**—The theory of annual pressure variations is applied to the problem of estimating the magnitude and spatial distribution of the annual range of pressure if a change in the output of solar radiation alters the annual range of temperature. The mean annual pressure range is computed on the assumption that the annual temperature range remains constant at the equator but increases from the equator polewards. The increased solar radiation intensifies the continental anticyclones and weakens the Icelandic and Aleutian Lows; the geostrophic circulation is changed slightly. If the postulated annual temperature range increases proportionately to observed temperature range, the annual pressure range increases proportionally and both continental highs and Aleutian and Icelandic Lows intensify with consequent increase in geostrophic circulation. The computed and observed pressure ranges are presented graphically. *Subject Headings:* **General circulation, Pressure variations, Solar radiation.**—*I.L.D.*

2.4–108 551.543.3

Mildner, P., **Kurze Ableitung einiger Formeln für die Untersuchung meteorologischer Periodizitäten.** [A brief derivation of several formulas for the investigation of meteorological periodicities.] *Leipzig, Universität, Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 15:147–158, **1949.** 6 equations. **DWB**—Formulas and methods were worked out at Leipzig and Prague for harmonic analysis and auto-correlation of pressure waves (of more than one day). Application is made also to studies of symmetry points and correlations. *Subject Headings:* **Symmetry points, Periodicities, Harmonic analysis.**—*M.R.*

WIND

2.4–109 551.551

Koo, Chen-chao, **The general laws of frequency distribution of wind in a gust.** *Meteorological Magazine, Nanking*, 19(1–4):58–62, Aug. **1947.** 8 refs., equations. In Chinese, English summary p. 58. **MH-BH**—The function for distribution of wind velocities in gusts is calculated when the two horizontal components of turbulence are correlated. The correlation is found to decrease as the steady wind velocity increases. *Subject Headings:* **Turbulence, Gusts.**—*C.E.P.B.*

2.4–110 551.551

Shiotani, M., **Turbulence in the lowest layer of the atmosphere. (3rd and 4th Reports.)** *Meteorological Society of Japan, Journal, 2nd Ser.*, 28(5,6):167–177, 181–187, May, June, **1950.** 10 figs., 5 tables. In Japanese, English summary p. 176–177, 187. **DWB**—Fluctuations of temperature at 1, 3, 5 and 15 meters above ground were measured by resistance thermometers of nickel wire .03 mm. diameter and 80 cm. long. Fluctuations 0.3–0.4°C. at 1 m. above ground and 0.2–0.1 at 15 m. Variations in time and space are correlated; vertical correlation greatest when ground temperature is increasing rapidly. Duration of fluctuations 8–16 secs. In Pt. 4 the difference between summer and winter is set out (turbulence above 10 m. greater in sum-

mer). Velocity fluctuations and mixing length increase proportionally to mean wind speed and eddy viscosity to its square. Turbulence (due to random mixing) is negatively correlated with fluctuations of temperature (due to local convection on clear still days). *Subject Heading:* **Turbulence.**—*C.E.P.B.*

2.4–111 551.555:551.509.3(435)

Herzog, J., **Die synoptische Bedeutung der Ostwinde in Südbayern.** [Synoptic importance of the east winds in South Bavaria.] *Leipzig, Universität, Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 15:34–39, **1949.** 2 figs., refs. **DWB**—In southern Bavaria an unusually high frequency of winds from E or NE occurs. Part of these winds are cyclonic and part anticyclonic. The synoptic conditions giving rise to the *cyclonic* east winds are analyzed for 1946–7 and the average time between onset of the cyclonic east wind and the beginning of bad weather at Munich is determined. Observations at Zugspitze and Hohenpeissenberg for specific cases show that an even greater warning of bad weather can be had by careful analysis of these key stations' winds and weather. *Subject Headings:* **Wind regime, Weather forecasting, Munich, Bavaria.**—*M.R.*

2.4–112 551.55(54)

*Ramaswamy, C. and Majumdar, K. C., **The general characteristics of squalls at Peshawar.** *India, Meteorological Dept., Memoirs*, Vol. 28, Pt. 1, **1950.** 53+p. plates, tables, refs., 2 append. **MH-BH**—This article is a thorough study of the characteristics of 410 squalls which passed over Peshawar during 1927–1943. The monthly, diurnal and seasonal distribution of the squalls, their direction, velocity and duration and their relation to thunderstorms and dust-storms are treated with reference to the changes in pressure, temperature and humidity. The relationship between squalls and the veering and backing of ground winds and local upper winds, peak velocities of squalls, multiple squalls, squalls with changing directions and squally winds are discussed. On the basis of a synoptic study of squalls in the monsoon period they are divided into the following groups: air mass type, cold front type and air mass with cold front type. The mechanism and synoptic characteristics of these squalls are presented. Statistical data on these characteristics are given in tabular form and also graphically. *Subject Headings:* **Squalls, Peshawar, Pakistan.**—*I.L.D.*

2.4–113 551.555:551.513.2(265)

Riehl, Herbert, Yeh, Tu-cheng, Malkus, Joanne Starr and La Seur, Noel E., **The northeast trade of the Pacific Ocean.** Chicago, University, Dept. of Meteorology, Nov. **1950.** 24+ leaves. 24 figs., 3 tables, 30 refs., 18 equations. **MH-BH**—The main contributions to our knowledge of energy exchange between the oceans and the atmosphere and between the tropics and the polar regions are reviewed. Specific data for a section of the North Pacific (northeast of Hawaii) are collected and analyzed by means of energy diagrams and cross sections (from the sea surface to 3 km.). It is shown that downward transfer of mass takes place through the trade inversion. Calculations of energy balance show that there is a net transport of latent heat upward and away from the area. Momentum and moisture balance are also calculated and discussed. *Subject Headings:* **Atmospheric circulation, Trade winds, Energy transport, Energy exchange, North Pacific Ocean.**—*M.R.*

2.4–114 551.555.4(99)

*Loewe, F., **A note on katabatic winds at the coasts of Adélieland and King George V Land.** *Geofisica Pura e Applicata*, 16(3–4):159–162, April–June **1950.** In English. 2 tables. **MH-BH**—Winds from ice cap to neighboring seas are caused by super-adiabatic lapse rates in temperature when nocturnal radiation lowers temperatures over the Antarctic continent, while open sea temperatures remain constant. During December, lulls occur in every case when insolation is strong over the ice cap. Lulls are frequent during other summer months and in direct proportion to the strength of daytime insolation. Analysis based on personal experience of the author in 1949–50 and on radiosonde observations in Jan. 1950. *Subject Headings:* **Katabatic winds, Adélie Land, King George V Land, Antarctic.**—*M.R.*

2.4–115 551.555.4(459)

Koch, H. G., **Ein lokaler Tagesfallwind in Mittelsardinien.** [A local katabatic wind during the daytime in central Sardinia.] *Leipzig, Universität, Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 15:40–60, **1949.** 4 figs., tables, 5 refs. **DWB**—A thorough and detailed analysis of topographic, synoptic and aerological conditions responsible for a curious cold mountain wind which sets in during the middle of the afternoon on hot summer days and lasts until sunset. This *bora* arises as a sea breeze which pours over a ridge from a 3–4000 ft. plateau and descends into the Tirso Valley of Sardinia. Frequency of ascending and descending winds is tabulated and individual cases are studied. Origin of these winds is discussed at length. *Subject Headings:* **Katabatic winds, Sea breezes, Bora, Sardinia.**—*M.R.*

2.4–116 551.556:551.465

Hidaka, Koji, **Surface contours due to wind-driven currents in an enclosed ocean.** *Oceanographical Magazine*, Tokyo, 2(1):17–26, March **1950.** 3 figs., table, 4 refs., 14 equations. In English. **DWB**—An attempt to estimate the surface contours due to the prevailing wind system in a uniform rectangular ocean comparable to the North Pacific. Diagram shows calculated wind streamlines and iso-levels, transport lines and stress on the surface. Assuming a max. wind speed of 10 m./sec. the max. level in center of western half is calculated as 9.5 cm. above that in center of eastern half. *Subject Headings:* **Wind effects, Ocean currents, Sea surface contours.**—*C.E.P.B.*

2.4–117 551.557:551.508.85

Gormley, P. M., **High weather.** *Aero Digest*, 61(5):30–31, 105–107, Nov. **1950.** 5 figs. **DLC**—Methods of determining winds at very high altitudes are discussed and illustrated. Balloons reach 100,000 ft. and rockets 250 miles (but rockets are useless for determining winds). Observations of noctilucent clouds or of meteor trails give occasional information on winds at certain altitudes, but recently measurements of the movement of sporadic E-layer ionic drift have given more consistent results. Radar reflections from drifting meteoric dust clouds give a Döppler effect (interference) arising from winds of high speeds in the stratosphere. Methods used for measurements of ionic or meteoric drift by radar are shown diagrammatically. *Subject Headings:* **Upper wind measurements, Radar echoes.**—*M.R.*

2.4–118 551.557 551.524.7

Scrase, F. J., **Wind and temperature measurements up to 30 km.** *Nature, London*, 164(4170): 572, Oct. 1, **1949.** fig., 6 refs. **DLC**—Brief discussion of results of seven radio and radar soundings released in the south and east of England which reached 30 km. Double tropopause and easterlies from 20–30 km. are mentioned. A more detailed report appears in *Meteorological Magazine*, Oct. 1949. *Subject Headings:* **Upper air winds, Upper air temperatures.**—*M.R.*

AQUEOUS VAPOR AND HYDROMETEORS

WATER VAPOR AND CLOUDS

2.4–119 551.571:551.501.6

Tizzano, Antonio, **Sulla determinazione e sul calcolo dell'umidità dell'aria.** [On the determination and evaluation of the humidity of the air.] *Geofisica Pura e Applicata*, 16(3–4):136–140, April–June **1950.** 2 figs., table, 6 equations. Italian and English summaries p. 136. **MH-BH**—Two nomograms (and data on which they are based) are presented for calculating the relative humidity and the saturation deficit of the air from dry and wet bulb reading of a psychrometer. Formulas used are discussed. (*Same item* as No. 2D–197 in Pt. II.) *Subject Headings:* **Humidity measurements, Nomograms.**—*M.R.*

2.4–120 551.573

Jaw, Jeou-jang and Koo, Chen-chao, **A note on the equation for evaporation.** *Meteorological Magazine, Nanking*, 19(1–4):47–50, Aug. **1947.** In Chinese, English summary p. 47. **MH-BH**—Taking power law variation of wind with height, Thornthwaite's evaporation

expression is developed into a complex equation which gives good results. (Item annotated in *Meteorological Abstracts*, K–146, Nov. 1950.) *Subject Heading:* **Evaporation theory.**—*C.E.P.B.*

2.4–121 551.573

*Misra, R. K., **Some preliminary studies on evaporation, transpiration and evapo-transpiration.** *India, Central Board of Irrigation Journal*, Simla, 6(4):442–448, Oct. **1949.** 2 figs., 4 tables, 11 refs. **DGS**—Evaporation from bare soil with varying water content, from soil with plant covering, and from open water surfaces is compared. Data obtained at Poona indicate that when soil moisture is 35–50% (or more) the evaporation is greater from bare than from soil covered with vegetation. Evapotranspiration must be measured separately from evaporation and transpiration. Evaporation from moist soil is the same as from free-water surfaces, but decreases as soil dries out. *Subject Headings:* **Evaporation, Evapotranspiration, Poona, India.**—*M.R.*

2.4–122 551.573:551.579

*Ramdas, L. A., **Soil moisture and evaporation investigations.** Paper contributed to the 17th Annual Meeting of the Research Committee of the Central Board of Irrigation, India, July **1947.** 11 p. 3 figs., 7 tables, 24 refs., equations. **DA**—At Poona, comparative observations were made between 4 kinds of evaporimeters during the period 1935–40, and other comparisons made under varying environmental conditions (vegetative cover, depth of water table, soil types, etc.) during 1941 and 1942. Data and methods of evaluation and computation are given. Several special investigations on new types of instruments and various aspects of plant growth under various chemical and physical conditions are made. *Subject Headings:* **Evaporation, Evaporimeters, Soil moisture, Agricultural meteorology, Poona, India.**—*M.R.*

2.4–123 551.574.1

Aliverti, G. and Lovera, G., **Sui nuclei di condensazione di origine marittima.** [On condensation nuclei of maritime origin.] *Geofisica Pura e Applicata*, 16(3–4):133–135, April–June **1950.** 4 refs. Italian and English summaries p. 133. **MH-BH**—Calculation of the probable number of saline condensation nuclei taken by the atmosphere from the sea under various conditions. Critical evaluation of similar calculations made by G. C. Simpson and by H. Köhler. Effect of bubbling and of sea spray discussed. *Subject Headings:* **Condensation nuclei, Saline nuclei.**—*M.R.*

2.4–124 551.574.1

Miyata, Y., **On the deformation of colliding water drops (I).** *Meteorological Society of Japan, Journal, 2nd Ser.*, 28(2):71–75, Feb. **1950.** 2 figs., 2 refs., 17 equations. In English, summary in Japanese p. 75–76. **DWB**—Author calculates the differential equation of the distorted surface of two water drops of different sizes approaching directly, and obtains a definite solution. *Subject Headings:* **Condensation nuclei, Cloud physics.**—*C.E.P.B.*

2.4–125 551.574.1:523.78

Ohta, S., **Measurements of condensation nuclei.** In: Report of solar eclipse observation May 9, 1948. *Geophysical Magazine, Tokyo*, 19(3–4):165–169, Dec. **1949.** 2 figs., 8 refs. In English. **MH-BH**—Continuous observations on condensation nuclei were made for seven days including day of solar eclipse, May 9, 1948, at Rebun Island, Japan in atmospheres free of artificial pollution. Total nuclei were counted with Aitken counter and charged nuclei by Scrase's method. On clear days the total number of nuclei increased at midday; on a cloudy day it remained fairly constant. The number of uncharged nuclei remained constant during all observations. On day of eclipse the midday increase in number of nuclei was about 20% less than on clear days. The daily change in nuclei, which is a local phenomenon, may be attributed to the drying effect which low atmospheric humidity and sunshine exert upon sea water or sea spray. *Subject Headings:* **Condensation nuclei, Solar eclipses, Rebun Island, Japan.**—*I.L.D.*

2.4–126 551.576

Project Cirrus. *American Meteorological Society, Bulletin*, 31(8):286–287, Oct. **1950.** **MH-BH**—The activities and results accomplished by General Electric in its cloud physics research project since 1947 are outlined. *Subject Heading:* **Cloud physics research.**

2.4–127 551.576.1:523.78

Abe, M., **The observation of the change of cloud amount.** In: Report of solar eclipse observation May 9, 1948. *Geophysical Magazine, Tokyo*, 19(3–4):146–152, Dec. **1949.** 4 figs., 7 photos. In English. **MH-BH**—The effect of a solar eclipse upon the formation and dissipation of clouds was studied by means of whole sky motion pictures. The method of observation is described; the apparatus is illustrated and the photographic record of changes of cloud cover, as well as numerical data on changes in amount of cloud with progress of eclipse, are given. The intermediate and low cloud layers diminished after beginning of eclipse and remained small up until time of maximum eclipse. The former began to increase at time of maximum eclipse and latter reappeared shortly after time of maximum eclipse. The dissipation of intermediate layer is attributed to descending air currents acting above cloud formation level and formation of clouds at maximum obscuration is the result of cooling of ascending air. The formation of low clouds is explained by air being cooled near the ground on the windward side of an obstruction and then impelled upwards by this obstruction. *Subject Headings:* **Clouds, Solar eclipses, Japan.**—*I.L.D.*

PRECIPITATION

2.4–128 551.577.2(92)(952)

*Berlage, H. P., Jr., **Regenval in Indonesië.** [Rainfall in Indonesia.] *Indonesia, (K.) Magnetisch en Meteorologisch Observatorium te Batavia, Verhandelingen*, No. 37, [1949]. 212 p. numerous tables, 3 fold. maps. **MH-BH**—This volume contains observations of precipitation at all stations in the Netherlands East Indies (including Dutch New Guinea) which have been in operation for at least five years and covers the period from 1879 to 1941 inclusive. There are 4,339 stations and their positions are marked on maps. The tables give data on mean monthly rainfall in mm., mean monthly number of rainy days, mean monthly daily max. rainfall in mm., absolute max., month and year of absolute max., and max. rainfall next but one. A detailed station location chart supplements the 47-page Alphabetical Catalogue of Stations. *Subject Headings:* **Precipitation distribution, Indonesia.**—*I.L.D.*

2.4–129 551.577.2(43)

Lehmann, M., **Häufigkeit und meteorologische Ursachen von Starkregen im dresdener Gebiet.** [Frequency and meteorological causes of heavy rains in the Dresden area.] *Leipzig, Universität, Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 15:93–106, **1949.** 3 figs., 2 tables, 6 refs. **DWB**—Heavy rain is defined as 15 mm. in 24 hours. Variation in total diurnal rainfall from year to year is shown, by an analysis of Dresden rainfall records for 1921–1946, to be mainly due to variation in number of days with heavy rain. Monthly variations throughout this period are also analyzed and discussed (60% of rain in July and 18% in Feb. due to heavy rain). Eight synoptic types are found among the 257 cases examined. Monthly and annual frequency of each type is tabulated. Causes discussed. *Subject Headings:* **Precipitation variations, Thunderstorm rainfall, Dresden, Germany.**—*M.R.*

2.4–130 551.577.2(54)

*Ramaswamy, C. and Suryanarayana, N., **Rainfall at Peshawar.** *India, Meteorological Dept., Memoirs*, Vol. 28, Pt. III, **1950.** p. 121–137+. plates, tables, refs. **MH-BH**—This paper is a comprehensive analysis of autographic rainfall records at the Peshawar Observatory during the period 1928–1944. The aspects of rainfall on which tabular data are given and which are discussed are as follows: diurnal variations of rainfall and rain hours by months and seasons, unusually long frequencies of hourly rainfall amounts by months, heaviest hourly rainfall, average hourly intensity of rainfall, very intense rainfall in short periods and the relationship between rainfall and local upper winds. By synoptic analysis it is shown that abnormally intense rainfall in short periods is associated with a high degree of convective

instability in a small pressure interval in ascending moist air. The authors concluded that in winter the rainfall is of the warm front type while in the monsoon season "it is mainly of the cold front type and partly of the local instability type." "It has also been found that the rainfall in the hot weather period is mainly of the local instability type while the rainfall in the pre-winter period is of the cold front and local instability types in the first half of this period, progressively changing to the warm front type towards the end of the period." *Subject Headings:* **Precipitation distribution, Precipitation variations, Peshawar, Pakistan.**—*I.L.D.*

2.4–131 551.577.2:551.515.2(52)

Uwai, K., **On the movement of rainfall groups** (1). *Journal of Meteorological Research*, Tokyo, 2(8):217–225, July **1950.** 6 figs., 5 tables, ref. In Japanese, English summary p. (5). **DWB**—Isochrones of rainfall areas over parts of northern Japan before and during typhoon of Sept. 16, 1948 are plotted. They are analyzed on the assumption that the rain areas are wave-like atmospheric disturbances, frontal and non-frontal. Rainfall amounts are explained by the combination of two different waves. Their travel agrees with the upper air flow, the track being along the trough. *Subject Headings:* **Precipitation areas, Typhoons, Japan.**—*C.E.P.B.*

2.4–132 551.577.2:551.524.3:58

Visher, Stephen S., **High temperatures and the seasonal distribution of precipitation and some ecological consequences or correlations.** *American Midland Naturalist*, 44(2):478–487, Sept. **1950.** 17 charts, numerous refs. Reprint available. **DLC**—Author gives maps of U. S. showing seasons of greatest and least precipitation, total for Aug. and Sept., difference between early and late summer, mean annual max., highest, and highest day temperature, duration of hot weather and longest growing season. The ecological importance of these is discussed. *Subject Headings:* **Precipitation distribution, Temperature variations, Plant ecology.**—*C.E.P.B.*

2.4–133 551.577.3(45)

*†Bossolasco, Mario, **La persistenza del tempo in Liguria ed in talune località continentali.** [The persistence of weather in Liguria and in similar continental localities.] *Geofisica Pura e Applicata*, 16(3–4):163–180, April–June **1950.** 5 figs., 17 tables, 13 refs., 2 equations. English, German and Italian summaries p. 163. **MH-BH**—Frequency of dry and wet periods of varying length for 1841–1930 is calculated and presented in tables and graphs (broken down by periods 1841–70, 1871–1900 and 1901–30 and by seasons) for Genoa, and similar data given for comparative purposes for Milan, Chiavari, Savona and Alessandria. Increasing persistence of dry periods is associated with increasing meridional circulation since 1900 (greater frequency of easterly surface winds at Genoa). *Subject Headings:* **Precipitation variations, Drought, Persistence, Genoa, Italy.**—*M.R.*

2.4–134 551.577.31

Schmauss, A., **Tageszeitgebundene Wettervorgänge.** [Weather processes associated with the time of day.] *Zeitschrift für Meteorologie*, 4(6):161–166, June **1950.** 7 figs., 5 refs. **MH-BH**—Author studied diurnal variation of times of beginning (A) and ending (E) of precipitation at Munich and Potsdam. Peaks show considerable agreement in two separate periods and between the two stations. Both A and E show max. and min. at same time. They tend to fall at intervals of 60, 90, 120, etc. minutes, superposed in summer on max. at 6–7 and 14–15 h. Attributed to rhythms in lowest layer of atmosphere. Not exact enough for forecasting. *Subject Headings:* **Diurnal precipitation variations, Munich, Potsdam.**—*C.E.P.B.*

2.4–135 551.577.33:551.509.33

Abbot, Charles Greeley, **1947–1948 report on the 27.0074-day cycle in Washington precipitation.** *Smithsonian Miscellaneous Collections*, 110(4), March 10, **1948.** 2 p. 2 tables, 2 refs. **MH-BH**—From 27-day cycle certain dates were selected in 1947 when Washington precipitation should exceed average. Mean for these was 0.1166 inch compared with 0.1058 inch on other days. Preferred dates given for 1948. *Subject Headings:* **Precipitation variations, Long range forecasting, Washington, D. C.**—*C.E.P.B.*

2.4–136 551.577.33:551.509.33

Abbot, Charles Greeley, **1948–1949 report on the 27.0074-day cycle in Washington precipitation.** *Smithsonian Miscellaneous Collections*, 11(5), March 8, **1949.** 2 p. 2 tables, 2 refs. **MH-BH**—See corresponding report for 1947–48. (*Item* 2.4–135.) Rainfall on "preferred" days in 1948 was 0.175 inch, on others 0.137. *Subject Headings:* **Precipitation variations, Long range forecasting, Washington, D. C.**—*C.E.P.B.*

2.4–137 551.577.33:551.579.4(52)

Fukuda, K., **On the periodicity of the flood in Tohoku District in the historical point of view.** *Journal of Meteorological Research*, Tokyo, Vol. 2, Suppl.No. p. 58–60, Aug. **1950.** 4 figs., 4 tables, 5 refs. In Japanese, English summary p. 108. **DWB**—Flood records are examined from 1645 and in greater detail since 1900. Periodicities found are 37, 31 and 24 years, also 12, 6–7 and 3 (or 3–4) years and 8 months. *Subject Headings:* **Floods, Periodicities, Tohoku District, Japan.**—*C.E.P.B.*

2.4–138 551.577.37:519.2

Foster, Walter Dean, **A comparison of nine indices of rainfall intensity.** *American Geophysical Union, Transactions*, 31(6):894–900, Dec. **1950.** 2 figs., 5 tables, 5 refs., 7 equations. **MH-BH**—The author develops five precipitation indexes compounded out of either additive or multiplicative combinations of 5, 15 and 30 minute rainfall intensities supplemented by a factor for runoff, defined as a function of infiltration and by a factor representing the time of occurrence of maximum rainfall. The best measure of intensity is the parameter showing the maximum correlation with either runoff or soil loss or both after eliminating the effect of total rainfall. A linear equation representing the relationship between runoff and intensity is fitted by multiple regression. The simple rainfall intensity indices, namely 5, 15, 30 minute and average intensity and the compounded intensities are compared by converting the rankings of the parameters to normal deviates and performing an analysis of variance on the normal deviates. The relative merits of the parameters in characterizing rainfall intensities are discussed. *Subject Heading:* **Precipitation intensity.**—*I.L.D.*

2.4–139 551.577.36

Glasspoole, J., **The reliability of rainfall over the British Isles (third paper): frequency distribution.** Institution of Water Engineers, Advance copy **1950.** 13 p. 8 figs., 2 tables. To be printed in their "Journal" 5, 1951. **DGS**—Tabulates rainfall frequencies at Camden Square (London) and Glenquoich (Scotland) 1870–1943 for overlapping periods of 4, 8 and 16 months by deciles and also by amounts in inches. The latter are shown as histograms to which are fitted normal frequency curves adjusted for skewness and kurtosis. Although the average rainfalls at the stations (24.47 and 110.75 in.) are so different, the frequency curves expressed as percentages are similar. *Subject Headings:* **Precipitation frequencies, Precipitation distribution, England, Scotland.**—*C.E.P.B.*

2.4–140 551.577.37:551.588.6(44):551.579

§Baulig, H., **Les inondations de décembre 1947.** [The floods of December 1947.] *Strasbourg, Université, Faculté des Sciences, Institut de Physique du Globe, Annales, New Ser., Géophysique*, Pt. 3, Vol. 5, p. 39–48, **1950.** 2 figs., 2 tables, 12 refs. **DWB**—A summary of a number of articles and unpublished reports on the flood that occurred in Alsace and Lorraine during December 1947. The author describes the synoptic conditions over the flood area associated with the floods and such accessory phenomena as the rain shadow and föhn, and compares the floods of 1947 with those of 1919 in the same region. The role of forests, the damage inflicted and methods of flood control are discussed. *Subject Headings:* **Floods, Forest influences, Alsace-Lorraine, France.**—*I.L.D.*

2.4–141 551.577.37(52)

Fukuda, K., **On the frequency of heavy rainfall in Tôhoku District.** *Journal of Meteorological Research*, Tokyo, Vol. 2, Suppl.No. p. 1–9, Aug. **1950.** 2 figs., 12 tables, 4 equations. In Japanese, English summary p. 107–108. **DWB**—The frequency of heavy rain of amount x

is expressed in a formula exponential in x, and the values of the constants are calculated for representative points in the Tohoku District. A list of heavy rains 1908–1948 is included. *Subject Headings:* **Excessive precipitation, Tohoku District, Japan.**—*C.E.P.B.*

2.4–142 551.577.37:551.515.2(52)

Fukuda, K., **A study on the heavy rainfall.** *Journal of Meteorological Research*, Tokyo, Vol. 2, Suppl.No. p. 46–50, Aug. **1950.** 22 charts, 5 refs. In Japanese, English summary p. 108. **DWB**—Typhoons move toward regions of persistent negative pressure anomaly. There is also a negative pressure anomaly near Japan whenever heavy rains occur. [It is not clear what the charts represent.] *Subject Headings:* **Excessive precipitation, Typhoons, Japan.**—*C.E.P.B.*

2.4–143 551.577.37:551.515.2(52)

Kusano, K., **The flood damage in Tohoku District (1st and 2nd reports).** *Journal of Meteorological Research*, Tokyo, Vol. 2, Suppl.No. p. 34–46, Aug. **1950.** 4 figs., 18 charts, 6 tables. In Japanese, English summary p. 108. **DWB**—The relation of the center of heavy rainfall in Tohoku District to track and position of a typhoon is investigated. Heavy rainfall is expressed as mean of 10 representative points and frequency investigated. Periodicities of 3, 9 and 29 years are found (1895–1948). *Subject Headings:* **Excessive precipitation, Typhoons, Tohoku District, Japan.**—*C.E.P.B.*

2.4–144 551.577.37:551.513

Matsukura, H., **An analysis of the heavy rains by zonal index.** *Journal of Meteorological Research*, Tokyo, Vol. 2, Suppl.No. p. 54–58, Aug. **1950.** 6 figs. In Japanese, English summary p. 108. **DWB**—Occurrences of heavy rain were compared with 5-day mean zonal index. They often occurred when index fell from high to low or with a shallow minimum index. The index has a periodicity of 35 days, especially in upper air, and heavy rains are frequent when height of 700 mb. surface decreases in mid-latitudes or pressure rises rapidly in high latitudes. *Subject Headings:* **Excessive precipitation, Zonal index.**—*C.E.P.B.*

2.4–145 551.577.37(52)

*Umeda, S., **List of heavy rains in Akita Prefecture.** *Journal of Meteorological Research*, Tokyo, Vol. 2, Suppl.No. p. 61–64, Aug. **1950.** table. **DWB**—List of daily rainfalls exceeding 100 mm. from 1932 to 1945 and 1901–23, and also totals over several days. *Subject Headings:* **Excessive precipitation, Akita Prefecture, Japan.**—*C.E.P.B.*

SNOW

2.4–146 551.578.4:531

Cassel, F. L., **Snow and ice mechanics.** *Civil Engineering*, London, 45(533):715–717. Nov. **1950.** **DLC**—It is pointed out that the methods of research in snow and ice mechanics are analogous to those employed in soil mechanics. The methods of obtaining undisturbed snow samples, of measuring density, porosity, compressibility and snow pressure and of studying the properties of creep are discussed. An empirical equation for calculating snow pressure is given:

$$S \max = \frac{gh^2}{2} \quad \text{where } g = \text{unit weight of dry compacted snow.}$$

This discussion is based upon the work of R. Häfeli at Zurich. *Subject Headings:* **Snow mechanics, Ice mechanics.**—*I.L.D.*

2.4–147 551.578.41:551.311.128

Sulzlée, C., **L'étude scientifique de la neige et les résultats obtenus dans les Pyrénées.** [Scientific study of snow and results obtained in the Pyrenees.] *Houille Blanche*, Grenoble, Spec. No. B:741–750, **1949.** 5 figs., 3 photos. English summary p. 672. **DGS**—Studies of snow crystals, temperature in a snow cover, snow density, permeability to air, plasticity, movements on slopes and terraces, cohesion of a "snow bridge" and of pillars of snow, etc. have been made in the Pyrenees (at Barèges and Mongie) by the Forest and Hydrology

Administration and Tourism Committee of the High Pyrenees in order to forecast avalanches and to construct proper avalanche controls. *Subject Headings:* **Snow surveys, Snow crystal formation, Snow mechanics, Avalanche prevention, Pyrenees.**—*M.R.*

2.4–148 551.578.46(47)

Fel'dman, IA. I., **O vliianii snezhnogo pokrova na obrazovanie mestnoĭ pogody v usloviiakh russkoĭ ravniny.** [The effect of snow cover on formation of local weather under the climatic conditions of Russian plains.] *Problemy Fizicheskoĭ Geografii*, 14:92–103, **1949.** 5 figs., 2 tables, 7 refs. **DLC**—The effect of snow cover upon weather was investigated by the method of "complex-dynamic-analysis" developed by E. E. Fedorov and L. A. Chubukov. Orographic influences were eliminated; snow covered areas and bare ground lying under similar air masses at the same time were compared. The types of local weather and their frequency over snow covered and bare ground in the presence of various air masses, the corresponding daily amplitude of temperature and frequency of these amplitudes and daily max. and min. are discussed and the data are presented in graphs and tables. The conclusions of the study are as follows: the weather over a snow cover and bare ground differs with the prevailing air masses; with cold air masses the weather over a snow cover is mostly cold, cloudless, calm with large diurnal temperature amplitudes; over bare ground it is milder, cloudy, windy, with small temperature amplitudes; with warm air masses the weather over a snow cover is cold, cloudy with small temperature amplitudes; over bare ground it is warmer, with little cloudiness and with large temperature amplitudes; with local air masses the weather over a snow cover and bare ground is characterized by little cloudiness, moderate wind and large temperature amplitudes, but it is colder over a snow cover. *Subject Headings:* **Snow cover, Weather conditions, U.S.S.R.**—*I.L.D.*

HYDROMETEOROLOGY

2.4–149 551.579

Ioganson, V. E., **O razdelenii goda na gidrologicheskie sezony v usloviiakh ravniny evropeiskoĭ chasti Soiuza.** [Division of the year into hydrological seasons in the plains of European U.S.S.R.] *Problemy Fizicheskoĭ Geografii*, 14:143–148, **1949.** 5 tables, 5 refs. **DLC**—The author analyzes the seasonal distribution of runoff in various rivers of European Russia. Data are given on the average date of beginning of flood water and its duration, mean monthly distribution of runoff in percent of total annual runoff, mean percent runoff during spring and percent snow melt and runoff during spring. The hydrological characteristics of the various seasons are described. It is shown that they differ in the northern, central and southern parts of the U.S.S.R.; within these zones the runoff phases occur simultaneously. The hydrological seasons are not fixed; the date of beginning of spring flood is of fundamental importance in determining the time of the hydrological seasons. *Subject Headings:* **Runoff, Seasonal effects, U.S.S.R.**—*I.L.D.*

2.4–150 551.579

*Kuzin, P. S., **Vodnyĭ balans Sovetskogo Soiuza.** [The water balance of the Soviet Union.] *Priroda*, Moscow, 39(11):22–24, Nov. **1950.** table, equation. **DLC**—An estimate of the water balance for the entire Soviet Union is obtained by estimation of the rainfall, runoff and evaporation for each of the major drainage basins of European and Asiatic U.S.S.R. The coefficients of runoff for each basin are also given (0.21 for Central Asia to 0.70 for the Barents and White Sea areas; average for U.S.S.R. 0.46). For the 22,000,000 sq. km. of the U.S.S.R., the average rainfall is 400 mm., runoff 180 mm. and evaporation 220 mm. A table gives the area of each basin and the estimate in both cm. and km³ for each of the above elements of the water balance. Grandiose plans for changing nature (reclamation and use of ground water) are discussed. *Subject Headings:* **Hydrologic cycle, Reclamation, U.S.S.R.**—*M.R.*

2.4–151 551.579

†Langbein, Walter B. and others, **Annual runoff in the United States.** *U. S. Geological Survey, Circular*, No. 52, June **1949.** 14 p. 2 figs., map (fold. in pocket), 5 tables, 39 refs. **DWB**—The article covers the following topics: a general discussion of the nature of "runoff,"

a definition of "runoff" and its distinction from "stream flow" and "water yield"; a list of previous maps of annual runoff in the United States and of some world maps of runoff; preparation of map of distribution of average annual runoff in the United States; effect of climate, geology, topography, size of drainage area and of vegetation upon runoff. It is found that annual runoff for the United States ranges from less than a quarter of an inch to more than 80 inches, that the country-wide average is 8.5 inches and that average evapotranspiration is about 21.5 inches. The average annual discharge of rivers of the United States is about 1,800,000 cubic feet per second. Climate is the dominant factor affecting runoff. *Subject Headings:* **Runoff, Hydrologic cycle, United States.**—*I.L.D.*

2.4–152 551.311.182/3 551.579:551.524.37

Schaefer, Vincent J., **The formation of frazil and anchor ice in cold water.** *American Geophysical Union, Transactions*, 31(6):885–893, Dec. **1950.** 7 figs., 7 refs. **MH-BH**—The formation and structure of frazil and anchor ice under natural conditions are described. Frazil ice consists of thin, free floating, circular discs which become submerged by turbulence. Accumulations of these discs, followed by regelation, account for most of the underwater structures. Frazil ice forms when bulk water supercools to about −0.01°C. and air temperature is considerably below 0°C. Anchor ice consists of sheet-like crystals of ice which grow out from submerged objects in water. A method for inducing the formation of an ice cover by seeding supercooled water with small particles of solid CO_2 is described. The application of this dry ice method to the prevention of frazil ice formation is discussed. *Subject Headings:* **Ice formation, Hydrology, Frazil ice, Anchor ice.**—*I.L.D.*

2.4–153 551.579.1

*Khosla, A. N., **Analysis and utilisation of data for the appraisal of water resources.** *India, Central Board of Irrigation Journal*, Simla, 6(4):410–422, Oct. **1949.** 2 figs., 15 tables, 8 refs., equations. **DGS**—Water yield for India is calculated by means of a formula which the author compares with that of Vermeule (1894). The "rational" method (of the author) considers runoff as the remainder of the rainfall after evaporation and transpiration loss is deducted. The losses are proportional to the mean temperature as shown by a series of curves of diurnal variations in various meteorological elements. A color map shows isopleths of annual rainfall, runoff and temperature for all of India. Tables give data for basins of this region. *Subject Headings:* **Water resources, Hydrologic forecasting, Hydrologic cycle, India.** —*M.R.*

2.4–154 551.579.1/2

Wilm, H. G., **Discussion of "Interpretation of snow surveys" by Walter U. Garstka.** *American Geophysical Union, Transactions*, 31(6):937–939, Dec. **1950.** 2 refs. **MH-BH**—The author suggests that the best estimate of runoff should be obtainable by a combination of precipitation and snow survey records with the relative weight of each determined by rational and empirical analysis; most watersheds combine the phenomena of winter melting of snow with sublimation and evaporation of snow. *Subject Headings:* **Runoff, Snow surveys, Water supply forecasting.**—*I.L.D.*

2.4–155 551.509.3:551.579.2

Strauss, Fred A., **The use of temperature-runoff relationship in water-supply forecasting.** *American Geophysical Union, Transactions*, 31(6):879–884, Dec. **1950.** 6 figs. **MH-BH**—A method of water supply forecasting based upon climatological and stream flow data is described. On ordinary graph paper mean April temperatures are plotted as ordinates, observed mean April runoff in second-feet as abscissas and a family of curves is drawn in accordance with historical April-July stream flow in acre-feet. This relationship is explained by the fact that at a given temperature a smooth snow blanket produces snowmelt in proportion to the areas of the snow blanket exposed and that in high mountain basins there is a relationship in late season between snow pack area and snow pack volume. The use of an index method for verifying the relationship between temperature and runoff, and the accuracy of these relationships are discussed. *Subject Headings:* **Runoff, Snow cover, Water supply forecasting.**—*I.L.D.*

2.4–156 551.579.5:628.112

Kunin, V. N., **Zadachi izucheniia rezhima vod v pustyniakh Sredneĭ Azii.** [Problems of the investigation of the water regime in the deserts of middle Asia.] *Problemy Fizicheskoĭ Geografii*, 14:104–114, **1949.** 2 figs., ref. **DLC**—The ground waters of the middle Asian deserts are classified into those originating at considerable distances from a given locality and those of local origin. The geologic and geomorphologic factors determining the formation, occurrence and mineralization of ground waters of distant origin and the relationship of their water tables to surface relief and irrigation are discussed. In the case of local ground waters, whose water table depends upon local precipitation, the author considers the relationship between "effective precipitation" and level of water table, and the role of underground evaporation and condensation and of transpiration. *Subject Headings:* **Ground water, Deserts, Central Asia, U.S.S.R.**—*I.L.D.*

2.4–157 551.579.4(47)

Péreau, Mlle. Aimée, **La phase de la composante annuelle des niveaux des rivières de la plaine de l'est européen.** [Annual march of the river stages in the east European plains.] *Geofisica Pura e Applicata*, 16(1–2):38–46, Jan.–March **1950.** 7 figs. In French, French and English summaries p. 38. **MH-BH**—The annual cycle of river stages on the Vistula, Don, Volga, Dniester and Dnieper and their tributaries is shown graphically and various influences (temperature, snow melt, distance from source, etc.) discussed. Effect of distance from the sea also considered. *Subject Headings:* **River stages, Hydrographs, U.S.S.R.**—*M.R.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY OF PARTICULAR PLACES

2.4–158 551.4:551.582(57)

†Grigor'ev, A. A. (ed.), **Kazakhstan; obshchaia fiziko-geograficheskaia kharakteristika.** [Kazakhstan; general physico-geographical characteristics.] Moscow, Izdat. Akademii Nauk, SSSR, **1950.** 492 p. 56 figs., 4 fold. charts, 13 tables, extensive biblio. p. 462–473. **DLC**—A substantial volume consisting of six parts, each written by one or more authorities on 1) the exploration, 2) physiography, 3) climate, 4) rivers and lakes, 5) vegetation and soils, and 6) fauna of this vast area in Central Asia. In addition to the 36 pages on **Climate** by L. A. Chubukov, (*see item* 2.4–159) there is much of interest to the climatologist in the section on rivers and lakes (by D. I. Abramovich, V. E. Aref'eva and V. E. Ioganson) and the section on vegetation and soil (by L. N. Sobolev). *Subject Headings:* **Physiography, Climatology, Kazakhstan, U.S.S.R.**—*M.R.*

2.4–159 551.582(57)

Chubukov, L. A., **Klimat.** [Climate.] (Chap. III in: **Kazakhstan; obshchaia fiziko-geograficheskaia kharakteristika.** [Kazakhstan; general physico-geographical characteristics.] Grigor'ev, A. A. (ed.) Moscow, Izdat. Akademii Nauk, SSSR, **1950.** p. 141–176. 15 figs., 5 tables, refs.) **DLC**—Chapter III goes into considerable detail about the solar radiation and energy balance at different latitudes, the circulation and its effect on the climate at different seasons and the climate of various parts of Kazakhstan. The latter is illustrated by complex climagrams according to Chubukov (*see item* 2.2–127 and 2.2–128 in Feb. 1951 *Meteorological Abstracts*) for Ural'sk, Semipalatinsk and Kzyl-Ordy. *Subject Headings:* **Climatology, Kazakhstan, U.S.S.R.**—*M.R.*

2.4–160 551.582(51)

*Hu, Chen-to, **Climate of Chiu-Tsien.** *Meteorological Magazine, Nanking*, 19(1–4):74–81, Aug. **1947.** 4 tables. In Chinese. **MH-BH**—Table gives mean pressure, temperature, relative humidity, rainfall, prevailing wind, etc. *Subject Headings:* **Climatology, Chiu-Tsien, China.**

2.4–161 551.582(51):551.515.8

Lu, A. and Sze, Yi-hen, **On the weather of Tsungyi.** (An abstract.) *Meteorological Magazine, Nanking*, 19(1–4):28–33, Aug. **1947.** 5 figs., 8 refs. In Chinese, English summary

p. 28. **MH-BH**—Weather of Tsunyi (27°N, 107°E) in Kweichow plateau is governed by quasi-stationary cold fronts from NE overridden by warm air from S. Precipitation of warm front type, light but persistent and falling mainly at night. Stable waves move along the fronts but rarely develop into mature cyclones. Cold fronts absent only at height of summer, when weather is cold and showery. *Subject Headings:* **Climatology, Tsunyi, China.**—*C.E.P.B.*

2.4–162 551.582(494)

*Mörikofer, W., **Die Klimaverhältnisse von Wiesen.** [Climatic conditions in Wiesen.] *Naturforschende Gesellschaft Graubündens, Jahresbericht*, 82:53–88, **1950.** 7 figs., 15 tables, 16 refs. Reprint available. **DWB**—Wiesen is being redeveloped as a health resort and a special bioclimatic station was established in 1945 to extend an earlier 8-year series. The report gives extensive comparative data about sunshine, some data on temperature and wind speed (which is small), monthly means of cooling power (much smaller at Wiesen than at other Swiss places) and rainfall amount and frequency. Suitable for a health resort but not for winter sports. *Subject Headings:* **Climatology, Wiesen, Switzerland.**—*C.E.P.B.*

CLIMATIC VARIATIONS

2.4–163 551.583:551.311.15

Ives, Ronald L., **Glaciations in Little Cottonwood Canyon, Utah.** *Scientific Monthly*, 61(2):105–117, Aug. **1950.** 10 figs., table, 14 refs. **DLC**—A study of the tillite and moraines of the Little Cottonwood Canyon and of its immediate vicinity indicates that the area was extensively glaciated during very late Pre-Cambrian or early Cambrian time; that it was not glaciated during early Pleistocene; and that it was covered by "glacial ice of local origin during the latter part of the Pleistocene, probably from Illinoian through Wisconsin." An approximate correlation between the glacial stages in Little Cottonwood Canyon and those in the Monarch Valley, Colorado was established; but no definite correlation could be established between these glacial stages and the stages of Lake Bonneville. *Subject Headings:* **Climatic changes, Glaciation, Periglacial climates, Utah.**—*I.L.D.*

2.4–164 551.583:551.4

†Peltier, Louis C., **The geographic cycle in periglacial regions as it is related to climatic geomorphology.** *Association of American Geographers, Annals*, 40(3):214–236, Sept. **1950.** 9 figs., table, 70 refs. Remarks by Richard J. Lougee p. 236. **DLC**—Discussion of effect of temperature, rainfall, freezing and thawing on geological structures in the regions subject to glaciation during the Pleistocene. Evidence of periglacial climates (e.g. in Pennsylvania and Missouri) can be deduced by analogy with forms existing today in and near glaciated areas. Based on W. Morris Davis's concepts. Three pages of bibliography. *Subject Headings:* **Climatic changes, Geomorphology, Weathering, Periglacial climates.**—*M.R.*

2.4–165 551.583:13

†Geller, S. IU. **O klimaticheskikh periodakh.** [Climatic cycles.] *Problemy Fizicheskoĭ Geografii*, 13:46–59, **1948.** 3 figs., 67 refs. **DLC**—This is a critical review of the evidence for the existence of climatic cycles. The mathematical methods of establishing cycles are considered fallacious and the meteorological data, tree ring and varve evidence are both inadequate and contradictory. The 11-year sunspot cycle has no counterpart in any climatic cycle or in any periodicity of meteorological factors. The article contains an extensive bibliography. *Subject Heading:* **Climatic cycles.**—*I.L.D.*

2.4–166 551.583.2:517.512.2(52)

Fukuda, K., **On the period of meteorological disaster in historical times in Tôhoku District.** *Journal of Meteorological Research*, Tokyo, 2(8):237–243, July **1950.** 6 figs., 2 tables, 4 refs. In Japanese, English summary p. (5). **DWB**—Author subjected records of cool summers floods and droughts in Tohoku District since early centuries A.D. to periodogram analysis. Periodicities found: cool summers 30, 24, 12–13, 6–7 years; drought 80, 49, 30, 3 years; flood, 37, 31, 24, 11, 7–8, 3–4 years. The 30-year cycle appears to alternate in length between 27.3 years (–1282, 1514–1748) and 30.8 (1282–1514, 1748–). *Subject Headings:* **Climatic changes, Periodicities, Tôhoku District, Japan.**—*C.E.P.B.*

MICROCLIMATOLOGY

2.4–167 551.584 551.586:628.8

Brezina, Ernst and Schmidt, Wilhelm, **Das künstliche Klima in der Umgebung des Menschen.** [Artificial climate surrounding man.] Stuttgart, Ferdinand Enke, **1937.** 212 p. 22 figs., 28 tables, refs. **DLC**—This book, the combined effort of a physician and a meteorologist, is a comprehensive analysis and description of the various artificial climates under which men live, namely: the microclimate of clothing, of dwellings and of cities. The section on the measurement of climatic variables, on the heat economy of the body, on the microclimate of clothing and shoes, and on the thermal properties of fabrics is brief and much of it has become out of date. However, three-fourths of the book is devoted to the microclimates of dwellings and cities. Under the subject of dwelling microclimate the following topics are considered: the modification of the meteorological elements in the immediate vicinity of a building; the weather elements of light, heat and ions produced in the interior of a building; the thermal properties of building materials, namely, heat transmission, heat storage, moisture absorption; the vertical distribution of temperature, cooling power and air movement in rooms; the climate of work rooms, of churches, etc.; natural ventilation, air conditioning and heating of buildings. City microclimate is treated very thoroughly. The authors discuss the light and radiation conditions within a city; air pollution; the modification of temperature; precipitation and wind direction and velocity by groups of houses, by the direction of streets and by the general city plants; the diversity of climates within a city and various measures of improving urban climates. The comprehensive and systematic treatment of human microclimates make this book a valuable introduction to the general subject of human microclimatology in spite of the fact that the book is old. *Subject Headings:* **Microclimatology, Urban climates, Heating and ventilating.**—*I. L. D.*

2.4–168 551.521 551.584

Deacon, E. L., **Radiative heat transfer in the air near the ground.** *Australian Journal of Scientific Research, Ser. A, Physical Sciences,* 3(2):274–283, June **1950.** 2 figs., 4 tables, 12 refs. **MH-BH**—The author describes the construction of a radiation chart for calculating the rates of heating or cooling by long wave radiation in the lowest 100 meters of the atmosphere. The radiation due to CO_2 is taken into account and is considered to be additive to that due to water vapor. Since the emissivities of CO_2 and water vapor are independent of temperature, the radiation chart is constructed from the emissivities of moist air and water vapor and is based upon the following relationship for the diffuse radiation from an isothermal atmospheric layer of depth d: radiation flux $= e_d \sigma T^4$ where e_d = total emissivity of CO_2 and water vapor, σ = Stefan's constant and T absolute temperature of the air layer. The chart was applied to determine the rate of radiative cooling of the lowest 80 m. of the atmosphere, just before dawn, from published data for clear nights with little wind in southern England. It is shown that radiative exchange plays a large part in cooling the air near the ground during the later parts of clear nights in quiet weather. The rates of heat loss calculated by this chart are compared with those obtained by using Elsasser's chart which gives a value which is twenty percent less than that calculated from the author's chart. *Subject Headings:* **Radiative transfer, Micrometeorology, Carbon dioxide.**—*I. L. D.*

2.4–169 551.584:581.192

Pleshko, S. I., **Zavisimost' khimicheskogo sostava dikikh kormovykh rasteniĭ ot ekspozitsii sklona.** [The influence of the exposure of a slope on the chemical composition of wild fodder plants.] *Problemy Fizicheskoĭ Geografii,* 14:165–170, **1949.** 6 tables, 2 refs. **DLC**—The effect of slope exposure upon the chemical composition and nutritional properties of wild fodder plants was studied in various mountains of Tadzhikistan. Data are presented on the chemical composition of the plants during their various stages of growth and development in relation to slope exposure. Plants growing on southern slopes are richer in nutrients than similar species growing on northern slopes; there was no difference in chemical composition between plants growing on eastern and western slopes. *Subject Headings:* **Microclimatology, Plant chemistry, Tadzhikistan, U.S.S.R.**—*I. L. D.*

2.4–170 551.584

†Sekiguchi, T., **Introduction to local climatology.** *Geophysical Magazine, Tokyo*, 22(1):29–33, Oct. 1950. 5 refs. In English. **MH-BH**—A discussion of the definition of climatology and its relation to meteorology. The author believes climatology is not statistical meteorology but the *distribution* or relation of the synthesis of atmospheric conditions to the *area*, hence, the importance of local climatic studies and the concept of local climatology, especially with application to urban areas. *Subject Headings:* **Mesoclimatology, Urban climates.**—*M.R.*

2.4–171 551.58 551.584:631.4:63(04)(73)

*Whitson, Andrew Robeson, **Notes on climate and soils.** [Madison, Wisc.], **1941.** 246+leaves. numerous figs., charts and tables. Mimeographed. **DLC**—A comprehensive, mimeographed text on agricultural meteorology with particular emphasis on soil climatology. References cited indicate a broad basis of general works were consulted in preparation of this manuscript. Chapters include coverage of general meteorology (synoptic and dynamic), climatic classification, climate of U.S. in relation to agriculture, distribution of vegetation, soils, fertility of soils, erosion, use of precipitation in agriculture, relation of major crops to climate and soils and, finally, land classification according to various schools. Contains some good tabular data. *Subject Headings:* **Soil climatology, Agricultural meteorology, Textbooks, United States.**—*M.R.*

2.4–172 551.584.4:551.556.2:63

Daigo, Y. and Maruyama, E., **The micro-climatic study on the crop-fencing culture.** *Journal of Meteorological Research*, Tokyo, 2(7):199–203, July **1950.** 4 figs., table, 6 equations. In Japanese, English summary p. (3–4). **DWB**—The effect of wind breaks (produced by planting corn) around potato fields of various sizes was investigated. It was found that the wind was reduced 50% or more (but not so much with very light or strong winds), the temperature reached greater extremes and the humidity *lower* (*sic*) in sheltered fields than in the unprotected ones. Smaller fields were affected more by the shelter than the larger ones. *Subject Headings:* **Microclimatology, Agronomy, Shelter belts.**—*M.R.*

BIOCLIMATOLOGY

2.4–173 551.586:060

Berg, Hellmut, **Bericht über die 1. Tagung der freiburger Arbeitsgemeinschaft für bioklimatische Forschung vom 24. bis 26. März 1950.** [Report on the first conference of the Freiburg Working Committee for Bioclimatic Research—March 24 to 26, 1950.] *Geofisica Pura e Applicata*, 16(1–2):87–93, Jan.–March **1950.** In German. **MH-BH**—Sessions were devoted to study of: a) weather conditions in relation to disease or the activities of organisms; b) solar effects on organisms; c) climatotherapy; d) techniques in bioclimatic investigations (including statistical methods and tests). The problem of seasonal influences was among the most important considered. Among the well-known specialists who took part in this session were DE RUDDER, MÖRIKOFER, SCHULZE, WETZLER, CURRY, MENZEL and LOSSNITZER. *Subject Headings:* **Bioclimatology, Conferences.**—*M.R.*

2.4–174 551.586

Lee, John, **Introduction to bioclimatology.** *Meteorological Magazine, Nanking*, 19(1–4):34–46, Aug. **1947.** 2 figs., 5 tables. In Chinese. **MH-BH**—*Subject Heading:* **Bioclimatology.**

2.4–175 551.586:612 551.54

Baĭchenko, I. P., **Gazoobmen v pokoe i pri dozirovannoĭ myshechnoĭ rabote na vysote 3000 i 4250 m.** [The gaseous metabolism during rest and regulated muscular work at altitudes of 3000 and 4250 m.] (In Trudy El'brusskoĭ Ekspeditsii Akademii Nauk, SSSR, i Vsesoiuznogo Instituta Eksperimental'noĭ Meditsiny **1934** i 1935 goda. [Reports of the Elbrus Expedition 1934 and 1935.] Moscow, **1936.** p. 351–360. 4 figs., 4 tables, 14 refs. Summary in English p. 359–360. [*Akademiia Nauk, SSSR, Komissiia po izucheniiu stratosfery*, Tom II.]) **DLC**—The pulmonary ventilation during rest at an elevation of 4250 m. is reduced in some individuals but increased in others. During muscular work the pulmonary ventilation

increases less at high altitude than at sea level. The depth of respiration during rest increases at 4250 m.; during muscular work the increase in depth is less than at sea level. Basal metabolism increases at an altitude of 3250 m. in some individuals but diminishes in others. After increasing, it falls and then may rise again. The consumption of energy in doing the same work is greater at high altitude than at lower elevations. During rest at high altitudes the respiratory coefficient increases and exceeds unity; during muscular work it declines for a considerable period. *Subject Headings:* **Physiological climatology, Atmospheric pressure, Elbrus Expedition, U.S.S.R.**—*I.L.D.*

2.4–176 551.586:612

Kronheim, Georg, **Zur Klimatophysiologie des Stoffwechsels.** [Climate and the physiology of metabolism.] (In Trudy El'brusskoĭ Ekspeditsii Akademii Nauk, SSSR, i Vsesoiuznogo Instituta Eksperimental'noĭ Meditsiny 1934 i 1935 goda. [Reports of the Elbrus Expedition 1934 and 1935.] Moscow, **1936.** p. 395–404. fig., table, 17 refs. Summary in German p. 404. [*Akademiia Nauk, SSSR, Komissiia po izucheniiu stratosfery*, Tom II.]) **DLC**—Fasting blood sugar is generally higher at high altitudes (4250 m.) than at sea level although the mean difference is less than ten percent. At 3000 m. the max. attained by the blood sugar tolerance curve is greater than that at sea level. At 4250 m. the max. of the blood sugar is lower than under normal conditions and is reached later; at 5600 m. it is delayed even more. After a two week stay at 4250 m. the tolerance curve becomes normal again but the absolute increase is less than under normal conditions. These changes are attributed to the excitation of the sympathetic nervous system by oxygen deficiency together with accelerated decomposition of carbohydrates. *Subject Headings:* **Physiological climatology, Elbrus Expedition, U.S.S.R.**—*I.L.D.*

2.4–177 551.586:612

Timofeev, N. V., **Izmeneniia ostroty vkusa i reaktsii sliunootdeleniia na vkusovye razdrazhiteli v zavisimosti ot prebyvaniia na razlichnykh vysotakh gory El'brusa.** [Changes in the acuity of taste and the reactions of salivary glands to taste stimulants at various altitudes of Mount Elbrus.] (In Trudy El'brusskoĭ Ekspeditsii Akademii Nauk, SSSR, i Vsesoiuznogo Instituta Eksperimental'noĭ Meditsiny 1934 i 1935 goda. [Reports of the Elbrus Expedition 1934 and 1935.] Moscow, **1936.** p. 405–418. fig., 5 tables, 2 photos, 9 refs. Summary in English p. 417–418. [*Akademiia Nauk, SSSR, Komissiia po izucheniiu stratosfery*, Tom II.]) **DLC**—The sharpness of taste and the reactions of the salivary glands altered after a stay of 7 days at altitudes of 2200 m., 5200 m. and 4250 m. The change was greatest at the lowest altitudes. The taste of bitter, sour and salt increased at first but returned later to the initial values. With increasing elevation the sensation of sweetness became blunted, and the threshold concentration of glucose was highest while that of hydrochloric acid, salt and quinine was lowest. The normally stronger salivary reactions were not produced by gradually increasing concentrations of hydrochloric acid and salt. The reactions of the salivary glands to glucose and quinine remained almost unchanged. *Subject Headings:* **Physiological climatology, Elbrus Expedition, U.S.S.R.**—*I.L.D.*

2.4–178 551.586:615.8

Mörikofer, W., **Die klimatologischen Gesichtspunkte in der Kurortplanung.** [Planning of resorts from the climatological viewpoint.] Erlenbach-Zürich, Bauliche Sanierung von Hotels und Kurorten, [n.d.] 10 p. 3 figs. Reprint available. **MH-BH**—A discussion of the meteorological factors which should be considered in planning and operating health resorts: solar radiation intensity and duration, wind and temperature, humidity, rainfall, snow, atmospheric purity and pressure. Mention is made of other factors such as proximity of lakes, woods, mountains, etc. The science of "*Kurortklimatologie*" is defined and considered at some length, as well as brief mention of the effects of the various factors on health. *Subject Heading:* **Climatotherapy.**—*M.R.*

2.4–179 551.586:616

Berg, Hellmut, **Die Auslösung von Krankheiten durch meteorologische und solare Vorgänge.** [Causation of diseases by meteorological and solar influences.] *Naturwissen-*

schaftliche Rundschau, 3(4):161–164, April **1950. DA**—The author reviews some of the literature regarding the causation of non-infectious diseases by meteorological and solar phenomena. The relationship of cold fronts, warm fronts and air masses to premature rupture of fetal membrane, pulmonary hemorrhage, etc.; the relationship of variations in the earth's electromagnetic field resulting from eruption of solar corpuscles and intense ultraviolet radiation to eclampsis; and the role of cold fronts in the production of asthma in guinea pigs are discussed. The mechanism of causation, which may be the action of ions, atmospheric electricity, ozone concentration and trace substances acting upon the vegetative nervous system, is considered. *Subject Headings:* **Meteorological influences, Bioclimatology, Medical climatology.**—*I.L.D.*

2.4–180 551.586:63(02)

†Azzi, Girolamo, **Ecologia agricola.** [Agricultural ecology.] Caracas, Editorial Elite, **1947.** 305 p. 28 figs., fold. chart, tables, biblio. p. 289–301. **MH-BH**—A detailed, analytical treatment of the subject of crops in relation to environment (especially climate) by one of the most progressive and internationally famous climatologists. The methods used by Azzi for a score of years in his work in Italy and elsewhere are applied to teaching agricultural ecology in Venezuela and to solving specific problems. The basis of the Azzi philosophy is that the climate as a whole (not individual elements of climate) affects plant development, but the species or even the variety of plant must have its own climatic classification and no general climatic classification can be devised which may be applied to all regions or all crops. In his text he makes liberal use of scatter diagrams in which he correlates phenological or crop growth factors with climatic conditions to show the optimum conditions (or vice-versa). He also uses the frequency distribution of climatic elements in place of average or extreme values. The crops considered specifically are: wheat, rice, cotton, coffee, various fruits and vegetables, olives, chestnuts, etc.; mainly those grown in Venezuela. A 13 page bibliography lists numerous works of the author and other (mostly Italian and Russian) agro-climatologists. *Subject Headings:* **Agricultural climatology, Plant ecology, Phenology, Textbooks, Venezuela.**—*M.R.*

2.4–181 551.586:63

Fischer, Alfons, **Bericht über die agrarmeteorologische Tagung in Neustadt an der Haardt.** [Report on the agro-meteorological session in Neustadt on the Haardt.] *Geofisica Pura e Applicata*, 16(3–4):188–193, April–June **1950. MH-BH**—A comprehensive report of the session held on March 4 and 5, 1950 under the chairmanship of Prof. Lossnitzer. Papers read by W. Herbst, W. Kreutz, W. Krause, W. Haude, W. H. Fuchs, F. Schnelle H. Aichele, H. Zillig, P. Lehmann, Dr. Seemann, N. Weger and H. Lessmann are discussed at some length. *Subject Headings:* **Agricultural meteorology, Bioclimatology, Plant ecology, Conferences.**—*M.R.*

2.4–182 551.586:63

Whitmore, Joan S., **Agro-climatology. The scope of its application to S. A. agriculture.** *Farming in South Africa*, Pretoria, 23(266):293–303, May **1948.** 9 figs., 3 tables. **DA**—The wind, rainfall and temperature regime of South Africa is described. Maps showing the seasonal distribution of rainfall, the mean summer rainfall, distribution of first month in spring with more than one inch rainfall, duration of rainy season, month of max. precipitation and the evaporation precipitation ratios (the average for Dec., Jan. and Feb.) are presented. *Subject Headings:* **Agricultural climatology, South Africa.**—*I.L.D.*

2.4–183 551.586:631.4

Scott, J. D., **Veld and pasture management in the Natal high rainfall area.** *Farming in South Africa*, Pretoria, 23(270):607–614, Sept. **1948.** figs., table. **DA**—This article contains a brief, qualitative description of the rainfall regime of Natal, which is considered as the high rainfall section of the Union of South Africa. *Subject Headings:* **Agricultural climatology, Soil conservation, Natal, South Africa.**—*I.L.D.*

2.4–184 551.586:636

Bosman, S. W., **Climatological study on sheep in the Karroo.** *Farming in South Africa*, Pretoria, 23(264):169–182, March **1948.** 2 figs., 4 graphs, 4 tables, 12 refs. **DA**—Mature,

dry ewes of indigenous Blockhead Persian and Merino breeds, of exotic Dorset Horn and Leicester breeds and of Dorset Horn and Merino crosses manifest a rise in rectal temperature as atmospheric temperature rises even at 73°F. The elevation in rectal temperature is greatest in the exotic and least in the indigenous breeds. Observations on the grazing of lambing ewes of Merino crosses (Dorset Horn, Border Leicester and Romney Marsh crossed with Merino) showed that on cool days the sheep grazed all day, while on warm days they grazed chiefly in the morning and late afternoon. The growth of fat crossbred lambs provided with shade was more rapid and their carcass weights were heavier than the growth and weight of lambs not provided with shade. *Subject Headings:* **Agricultural climatology, Animal husbandry, South Africa.**—*I.L.D.*

2.4–185 551.586:636

Curasson, G., **Le climat tropical et la production animale.** [Tropical climate and animal husbandry.] *Acta Tropica*, 5(2):97–135, **1948.** 2 photos, 31 refs. French summary p. 131, German and English summaries p. 133–134. **DA**—A review of some of the literature dealing with the effect of tropical climates upon heat regulation, body temperature, blood composition and circulation, respiration, basal metabolism, sexual activities and productivity of various domestic animals such as cattle, sheep and chickens. The effect of climate upon disease resistance is discussed. Acclimatization of animals to tropical climates and the amelioration of climatic stress by breeding and special feeding are considered. *Subject Headings:* **Tropical climatology, Animal husbandry.**—*I.L.D.*

2.4–186 551.586:637

Bakalor, S., **Investigations on the composition of South African milk. IV. The influence of monthly variations in air temperature and rainfall on the composition of milk.** *Farming in South Africa*, Pretoria, 23(265):271–282, April **1948.** 5 figs., 5 tables, 9 refs. **DA**—The effect of variations in air temperature and rainfall upon the composition of milk is analyzed on the basis of 5 to 17 years of data. A strong positive relationship is found between the fat content of milk and the mean air temperature three or four months ahead, while no correlation was found between mean fat content and mean air temperature of the same month. Similarly, a lag of about three months is present between month of lowest rainfall and month with lowest fat content of milk. A strong, positive relationship is present between mean monthly rainfall and monthly means of solid non-fat content of milk but none between mean monthly temperature and solid non-fat content. The volume of milk production is correlated strongly with intensity of rainfall. In some areas percentage of fat content is least when production is highest; in others no relationship is present between the two. In one area the solid non-fat content was highest when production was highest; data for other areas were not available. The data are not analyzed statistically. *Subject Headings:* **Agricultural climatology, Dairying, South Africa.**—*I.L.D.*

INFLUENCE OF ENVIRONMENT

2.4–187 551.588.6

†Hughes, J. F., **The influence of forests on climate and water supply.** *Commonwealth Forestry Bureau, Forestry Abstracts*, Oxford, 11(2–3):145–153, 283–292, Dec. 1949, March **1950.** 47 refs. **DA**—An excellent summary of the literature. It is concluded that forests moderate extremes of temperature and lower the mean slightly. Absolute humidity is little affected, relative humidity is generally increased. There is some evidence that local rainfall over forests may be slightly greater than over neighboring open ground but regional effects are unproved. Combined losses by interception, transpiration and evaporation are probably greater from forests than from other land uses. On level sites removal of forests often improves water supply. On hill sides grass may be nearly as effective as forests in conserving water but difficulties of control (e.g. avoidance of over grazing) are greater. *Subject Headings:* **Climatology, Forest influences.**—*C.E.P.B.*

2.4–188 551.588.7

Parry, M., **The climates of towns.** *Weather*, 5(10):351–356, Oct. **1950.** fig., 2 tables, 5 refs. **DWB**—Accounts of town pollution and its effect on sunshine, towns as "heat islands,"

urban fog, modification of wind regime. Brief reference to planning town climate. *Subject Headings:* **Climatology, Urban climates, Artificial influences.**

SYNOPTIC CLIMATOLOGY

2.4–189 551.589

Flohn, Hermann, **Indianersommer—Altweibersommer; (Eine Studie zur vergleichenden Witterungs-Klimatologie).** [Indian summer—"Old wives"-summer; (A study on comparative synoptic climatology).] *Meteorologische Rundschau*, 1(9–10):282–286, March–April **1948.** 6 figs., 23 refs. **DLC**—*Subject Headings:* **Synoptic climatology, Indian summer.**

2.4–190 551.589

Trojer, Hans, **Ein Beitrag zu einer dynamischen Klimatologie.** [A contribution to dynamic climatology.] *Urania*, Barcelona, 34(220):112–129, Jan.–Dec. **1949.** 4 figs., 4 tables, 14 refs. In German with German summaries p. 112 and 118. Reprint available with translation in Spanish. **DWB**—Dynamic or synoptic climatology considers the totality of weather phenomena and their relationship to the general weather situation. It classifies climates in terms of weather types, which are based upon the frequency, sequence and manifestation of general weather situations at a given place. A statistical analysis of weather types combined with means of the individual meteorological elements represents the mean condition of the atmosphere at a particular place. A classification of general weather situations with a description of their characteristic weather and air movement is presented. On the basis of a ten year record of synoptic data the author determines the frequency, mean deviation, sequence and typical manifestation of the general weather situation in Austria during 1935–1944. *Subject Headings:* **Dynamic climatology, Synoptic climatology, Austria.**—*I.L.D.*

2.4–191 551.589.1:551.583

Lamb, H. H., **Types and spells of weather around the year in the British Isles: annual trends, seasonal structure of the year, singularities.** *Royal Meteorological Society, Quarterly Journal*, 76(330):393–429, Oct. **1950.** 17 figs., 4 tables, 2 appends. **MH-BH**—Daily weather maps of N.E. Atlantic region 1898–1947 classified into 7 types; frequency and annual variation of spells exceeding 25 days tabulated. The breaks define 5 natural seasons termed high summer, autumn, forewinter or early winter, late winter or early spring, spring or early summer. Diaries show the same pattern since at least 1660. Frequencies of types on individual days indicate more or less regular recurrences (singularities) and these are compared with those found by other authors. The characteristics of 21 singularities are defined in considerable detail. *Subject Headings:* **Synoptic climatology, Climatic variations, Singularities, British Isles.**

MISCELLANEOUS APPLICATIONS

OPTICAL PHENOMENA

2.4–192 551.592:522.1

Coutrez, Raymond, **Appréciation des qualités générales d'une station astronomique au point de vue de la turbulence et de la transparence atmosphérique.** [Evaluation of the general character of an astronomical observatory from the point of view of turbulence and atmospheric transparency.] *Ciel et Terre*, 66(11–12):249–255, Nov.–Dec. **1950. DLC**—Thermal or orographic effects contribute to increased or decreased turbulence of the atmosphere which, in turn, affects the clearness of images or the accuracy of measurements of elevation, or azimuth, in astronomical observations. Similarly, atmospheric composition affects the transparency and, as a consequence, the values obtained in actinometry or spectroscopy of stars or planets. Theoretical aspects are treated briefly in this article. *Subject Headings:* **Turbidity, Astronomical observatories.**—*M.R.*

2.4–193 551.593:523.2

*Horak, Henry G., **Diffuse reflection by planetary atmospheres.** *Astrophysical Journal*, 112(3):445–463, Nov. **1950.** 10 figs., 10 tables, 24 refs., 23 equations. **MH-BH**—Based on laws derived by Chandrasekhar, the author presents quantitative interpretation of observed albedo data (reflection, absorption, scattering and polarization) for several planets (Saturn,

Venus, Uranus, Neptune). Theoretical curves are compared with observed data showing possible influence of Rayleigh scattering. *Subject Headings:* **Optical phenomena, Planetary atmospheres.**—*M.R.*

2.4–194 551.593.64:77

Menzel, Donald H. and Wyatt, Catherine B., **Astrophysicists watch the sun.** *Physics Today*, 3(3):8–14, March **1950.** fig., photos. **DLC**—Brief, illustrated article on the High Altitude Observatory of Harvard University and the University of Colorado (at Climax, Col. at 11,500 ft.)—the highest permanent observatory in the world. The coronagraph (corona graph) and artificial moon, which simulates an eclipse of the sun, permits rapid accumulation of data on the sun's outer atmosphere. Observations of sunspots with special filters are also producing good results. Other coronagraph stations are at Pic du Midi in the Alps and on Kanzel and Wendelstein peaks in Germany, respectively. *Subject Headings:* **Coronagraphs, Mountain observatories, Solar atmosphere.**—*M.R.*

2.4–195 551.593.635

Bronsten, V. A., **IArkie serebristye oblaka, nabliudavshiesia 20–21 Iiunia 1950 g. pod Moskvoĭ.** [Bright silver clouds observed near Moscow on June 20–21, 1950.] *Priroda*, Moscow 39(11):50, Nov. **1950.** 4 refs. **DLC**—The silver clouds observed in the vicinity of Moscow on the night of June 20–21, 1950 occupied the total northern part of the horizon from NW to NE. A very bright ray, parallel to the horizon, stood out to the NE. The field of clouds on the N and NW side had a very complicated structure. The clouds moved with speed toward the west and gradually vanished. The observation lasted from 11:45 P.M. to 1:30 A.M. Estimating their height as 80 km., the clouds were 400 to 900 km. from Moscow. The author, while admitting that it has not yet been determined, is inclined to consider the phenomenon as the result of condensation of ice crystals on meteoric dust. *Subject Headings:* **Noctilucent clouds, U.S.S.R.**—*C.K.*

ELECTRICAL PHENOMENA

2.4–196 551.594

Hirayama, M., Araki, T., Kitamura, M. and Niida, I., **Magnetic and electric observations.** In: Report of solar eclipse observation May 9, 1948. *Geophysical Magazine, Tokyo*, 19(3–4): 174–193, Dec. **1949.** 13 figs., 9 tables. In English. **DWB**—Kelvin's water dropping apparatus was used as the collector for making observations on atmospheric electricity during the eclipse of May 9, 1948 and Benndorf's recording electrometer for measuring atmospheric potential gradient. Atmospheric conductivity was measured by eye observations for which Gerdien's aspiration apparatus and the Shimizu unifilar electrometer were used. The potential gradient reached a max. which was about 30% of the normal field at 12 h. 10 m.; the conductivity showed a min. at the same time. A specific effect of the eclipse could not be demonstrated since atmospheric electricity was disturbed by weather conditions. *Subject Headings:* **Atmospheric electricity, Potential gradient, Japan.**—*I.L.D.*

2.4–197 551.594.13:551.509.94

Nolan, J. J., **The control of the electrical conductivity of the lower atmosphere.** *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 3(1–2):17–28, **1950.** 4 tables, 16 refs., equations. English, German and French summaries p. 17–18. **MH-BH**—The local electric conductivity of the atmosphere depends on the concentration of small ions resulting from rates of production and removal. Removal is due mainly to condensation nuclei. Nuclei may be counted by Pollak's photoelectric counter and radii and masses determined by measuring diffusion coefficients and fall velocities. Ratios of total to uncharged nuclei under equilibrium conditions for various radii were found by experiments and theory, with good agreement. Observations in Dublin showed that atmospheric nuclei are not usually in equilibrium but Schweidler's law holds approximately. No simple relation could be found between atmospheric conductivity, rate of ion production and nucleus concentration, mainly because air-borne radioactive matter increases with increase of nuclei. *Subject Headings:* **Electrical conductivity, Atmospheric electricity measurements.**—*C.E.P.B.*

2.4–198 551.594.21:551.578.71

Weickmann, H. K. and aufm Kampe, H. J., **Preliminary experimental results concerning charge generation in thunderstorms concurrent with the formation of hailstones.** *Journal of Meteorology*, 7(6):404–405, Dec. **1950.** 3 refs. **MH-BH**—The hypothesis that the process of hailstone formation is fundamental to charge generation in thunderstorms is investigated by means of a laboratory experiment simulating conditions in a thunderstorm. In a cold chamber a metal rod is sprayed with distilled water, tap water, etc. The liquids were at 0°C. and the cold chamber had a temperature of −5°C. in one experiment and −12°C. in the other. The ice formed from each liquid had a negative charge which was 5×10^{-12} coulombs at a droplet velocity of 15 m./sec. With this charge, a thundercloud volume of 216×10^{6} m^3 containing five hailstones per cubic meter, each with a cross section of 1 cm^2 and a fall velocity of 15 m. per second, would generate one lightning flash of about five coulombs per minute. The ice deposited in the rod resembled the structure of hailstones. *Subject Headings:* **Hailstones, Thunderstorm electricity.**—*I.L.D.*

2.4–199 551.594.25:621.396.9

Atlas, David and Banks, Harold C., **A virtual echo-layer above the bright band.** *Journal of Meteorology*, 7(6):402–403, Dec. **1950.** 2 figs., 6 refs. **DLC**—The authors dispute the evidence for a layer-type echo above the bright band presented by Austin and Bemis (*see item* No. 7–129, in July 1950, *Meteorological Abstracts*). They assert that stratified radar echoes from above the freezing level are usually associated with ice crystal or snow clouds and differ from and have greater vertical extent than the true bright band. It is shown that similar echo layers are found in a theoretical radar model of an idealized precipitation system in which there is no associated layer of ice-crystals or snow, namely in a virtual layer. The mechanism of formation of vertical layers is described. *Subject Headings:* **Radar precipitation echoes, Bright band echoes.**—*M.R.*

2.4–200 551.594.25:621.396.9

Austin, Pauline M. and Bemis, Alan C., **Reply.** [**on "A virtual echo-layer above the bright band."**] *Journal of Meteorology*, 7(6):403–404, Dec. **1950.** ref. **MH-BH**—In reply to above article, Austin and Bemis state that the theoretical case of Atlas and Banks does not resemble a layer above the bright band and is more extreme than any which would be observed experimentally because of the assumption of heavy rain over a large area. *Subject Headings:* **Bright band echoes, Radar precipitation echoes.**—*I.L.D.*

PART II. SELECTIVE ANNOTATED BIBLIOGRAPHY ON CONSTANTS, UNITS, TABLES AND DIAGRAMS

By: *Charles Ernest Pelham Brooks*

EXPLANATORY NOTE

The bibliography is intended to include references to the main sources of data on physical constants required by meteorologists and to aids to computation, both tabular and graphical. It is divided into three sections:

A. Constants, Units and General Works
B. Tables for Conversion and Reduction
C. Computing Diagrams (including Aerological Diagrams), Nomograms, Slide Rules.

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BIBLIOGRAPHY ON CONSTANTS, UNITS, TABLES AND DIAGRAMS

A. CONSTANTS, UNITS AND GENERAL WORKS

1896

2D–1 52 53 551.501

Fowle, Frederick Eugene (comp.), **Smithsonian physical tables.** 1st ed. **1896.** 7th rev. ed., *Smithsonian Miscellaneous Collections*, 71(1), 1920. 496 p. 8th rev. ed. Vol. 88, 1933. 682 p. 871 tables. **DWB**—Introduction gives units of measurement, conversion factors, standards, etc. Tables include: conversion tables, mathematical tables, constants, mechanical properties of a variety of substances, densities, barometric tables, acoustics, aerodynamics, viscosity, vapor pressure, thermometry, melting and boiling points, thermal conductivity and expansion, specific and latent heats, etc., cooling, radiation, spectroscopy, refraction, reflection and transmission, electrical and magnetic properties, atomic data, radioactivity, properties of the atmosphere, geodesy and geophysics, terrestrial magnetism and atmospheric electricity and astronomical tables. *Subject Headings:* **Barometer reduction, Constants, Hygrometry, Tables.**

1911

2D–2 51 52 53 54 551.501

Kaye, George William Clarkson and Laby, T. H., **Tables of physical and chemical constants and some mathematical functions.** 1st ed. Longmans, Green, **1911.** 10th ed. 1948. 194 p. numerous refs. **DWB**—This is the standard British reference book on physical quantities. Contents include: atomic weights; C. G. S. and British units, standards and systems; gravity, astronomical data, barometry, densities, elasticities, etc.; viscosities, hygrometry, pyrometry, physical and electrical properties of elements and compounds, radiation constants, photometry, magnetism and

terrestrial magnetism, atomic physics, chemical and geological data, etc. with full index. Mathematical tables p. 168–186. *Subject Headings:* **Barometer reduction, Constants, Tables.**

1917

2D–3 551.521.3

Fowle, Frederick Eugene, **Water-vapor transparency to low-temperature radiation.** *Smithsonian Miscellaneous Collections*, 68(8), **1917.** 68 p. figs., tables. **DWB**—Gives measurements of absorption of radiation of different wave lengths 1.3–60μ from a Nernst glower at 2200°K. by air at 50% humidity and 760 mm. pressure containing various amounts of precipitable water. For many years these were the standard tables. *Subject Heading:* **Atmospheric absorption.**

1918

2D–4 551.521.3

Hettner, Gerhard, **Über das ultrarote Absorptionsspektrum des Wasserdampfes.** [On the infrared absorption spectrum of water vapor.] *Annalen der Physik*, Ser. 4, 55(6):476–496, **1918.** 6 figs., plate, tables, 26 refs. **DWB**—A classical paper on absorption by steam water vapor, using tubes of 109 and 104 cm. filled with steam at 127°C. (0.89–17μ) and 32.4 cm. (16–21.4μ) and 32.4 cm. with air and water vapor (21–34μ). The large folding plate gives absorption curves in great detail, and max. are tabulated. This paper has been used in much research, but the values for steam are now considered inapplicable to the atmosphere. *Subject Heading:* **Atmospheric absorption.**

2D–5 551.501.3(09)

Platania, Giovanii, **Le unità assolute in meteorologia.** [Absolute units in meteorology.] *Rivista Marittima*, Oct. **1918.** 8 p. **DWB**—History of the adoption in meteorology of the "bar," absolute scale of temperature, dynamic meter and unit of acceleration (leo, gal). *Subject Heading:* **Units.**

1919

2D–6 551.501.3

Whipple, Francis John Welsh, **Absolute scales of pressure and temperature.** *Physical Society of London, Proceedings*, 31:237–241, **1919.** fig., table. Summary p. 241. **DWB**—Describes new scales adopted by meteorologists—millibar for pressure and "pseudo-absolute" for temperature (°C. +273). Advocates "Integral freezing point" scale, in which interval between absolute zero and freezing point is divided into 273° exactly. *Subject Heading:* **Units.**

1920

2D–7 551.501.3(02)

Humphreys, William Jackson, **Physics of the air.** 1st ed. Philadelphia, J. B. Lippincott, **1920.** 665 p. figs., diagrs. **DLC.** 3rd ed. New York, McGraw-Hill, 1940. 676 p. 225 figs., tables, append. **DLC, DWB**—Includes many constants used in meteorology. Fig. 38 is a gradient velocity nomogram, with horizontal scales of pressure gradient in mm./100 km. and latitude, separating a network of curved lines for radius of curvature of isobars (cyclone and anticyclone, km.) and horizontal lines of gradient velocity in m./sec. These are given also in tabular form in appendix. There are also a number of refraction tables for computations concerning halos. *Subject Headings:* **Constants, Geostrophic winds, Halos, Nomograms, Tables, Textbooks.**

1925

2D–8 551.510

Diehl, Walter S., **Standard atmosphere—tables and data.** *U. S. NACA Report* No. 218, **1925.** 29 p. **DLC**—BIRGE defines standard atmosphere (A_0) as pressure exerted by a column of mercury 76 cm. high of standard density (i.e. at 0°C.) under standard gravity $g_0 = 980.665$ in lat. 0°, referred to max. density of air-free water (.999972 ±.000002). $A_0 = (1.013246 \pm .000004) \times 10^6$ dyne/cm²/atmosphere. $A_{45} = (1.013195 \pm .000004) \times 10^6$. *Subject Heading:* **Standard atmosphere.**

1928

2D–9 551.547.1

Thomas, H., **Tabellen zur Differentialformel für barometrische Höhenmessung.** [Tables for the differential formula for barometric height measurements.] *Meteorologische Zeitschrift*, 45(2):64–66, Feb. **1928.** 4 tables. **DWB**—Gives values of A and B in the formula $dp_0 = A dp_n - p_0 B d T_m$, for $A = [8.17136 - 10] z_n / T_m$, $A = e\left(\frac{g}{R} \cdot \frac{Z_n}{T_m}\right)$ and $cB = \frac{g}{R} \cdot \frac{Z_n}{T_m^2}$ for $c = 10^4$ and 760. *Subject Heading:* **Barometer reduction.**

2D–10 551.501.3

Whipple, Francis John Welsh, **Units of energy.** *Nature, London*, 121:355–356, **1928.** table. **DWB**—Gives a table showing relative values in gravity-meter (45°), dynamic meter, joule/gm., kw.hr/tonne and calorie of potential energy, kinetic energy, heat, latent heat, calorific value and electrical energy. *Subject Headings:* **Conversion tables, Units.**

1931

2D–11 551.501(02)

Linke, F., Bergeron, T., Kassner, C., Keil, Karl and Knoch, Karl, **Meteorologisches Taschenbuch.** [Meteorological handbook.] 1st ed. Leipzig, Akademische Verlagsgesellschaft, **1931.** 316 p. 43 figs., 61 tables, index. **DLC, DWB**—The tables cover all the physical quantities required in meteorological calculation—general, water vapor, water and ice, coefficients of diffusion, specific heat, conduction, velocity of sound, gravity, radiation, height of atmosphere, reduction tables for pressure and temperature, tables for hygrometry and instrumental corrections, upper air tables, possible sunshine duration, etc. and mathematical aids. In the 2nd ed. (1933) will be found a number of additional tables and a German-English-French dictionary. In the 3rd ed. this feature is extended to Italian, Spanish, Russian. The 4th ed. (1939) brings together and completes the tables of the 1st and 2nd and summarizes mathematical methods (formulas, vector calculation, approximation, interpolation, smoothing, periodogram analysis, statistics). Then follow 152 tables of all physical and mathematical quantities likely to be required by a meteorologist. The 5th ed. (also 1939) is a revision of the 2nd, and is in effect a textbook of dynamic meteorology (by H. Ertel), instruments and methods of observation (E. Kleinschmidt), radio meteorology (G. Loeser, K. Schneider-Carius), radiation (F. Linke, F. Albrecht) and atmospheric electricity (H. Israël). The last three "editions" together form an essential tool of the meteorologist. *Subject Headings:* **Constants, Tables, Textbooks.**

1932

2D–12 551.501.3

Intensité normale de la pesanteur. Échelle thermométrique normale. Pression normale. Décisions prises par les Conférences Générales et par le Comité International des Poids et Mesures. [Normal intensity of gravity. Normal thermometric scale. Normal pressure. Decisions of General Conferences and of the International Committee of Weights and Measures.] *La Météorologie*, No. 8:16–20, **1932.** **DWB**—Quotes various resolutions and gives a number of fixed points and pressure corrections to them. *Subject Headings:* **Constants, Gravity.**

2D–13 551.521.3

Weber, Louis Russell and Randall, H. M., **The absorption spectrum of water vapour beyond 10μ.** *Physical Review*, 40:835–847, **1932.** figs., tables. **DLC**—Using a recording spectrograph with a slit only 0.2–0.5 mm. wide and tubes 2 and 3 m. long filled with steam or saturated vapor, the authors measured percentage absorption of radiation for a large number of wave lengths from 10.13 to 24.91μ (987.2–401.4 waves per cm.). *Subject Heading:* **Atmospheric absorption.**

1934

2D–14 551.5(02)

Brunt, David, **Physical and dynamical meteorology.** Cambridge, University Press, **1934.** 411 p. 112 figs., tables. 2nd ed. 1939. 428 p. 119 figs., tables. **DWB**—Includes a number of useful constants and tables. Illustrations of Hertz diagram, tephigram, absorption spectra, etc. Appendix gives tables for conversion and reduction, values of $(1000/p)^{0.288}$, hygrometric data, etc. *Subject Headings:* **Constants, Nomograms, Tables, Textbooks.**

1939

2D–15 551.501.3

Egersdörfer, Leonhard, **Zusammenstellung meteorologischer Konstanten.** [Collection of meteorological constants.] *Organisation Météorologique Internationale, Publications*, No. 48. Aerologische Kommission, Protocolle der Tagung in Berlin, 16–20 Juni, **1939.** p. 88–91. (Anlage XIII.) **DWB**—This paper gives standard values: gravity ($g_{45,0}$ = 980.616); gas constant (general) = 8313.6 $\times 10^4$ erg/degree; molecular weights, composition of atmosphere, equivalents, air density, R (air), density of water vapor relative to air (0.622035) and absolute, R (water vapor), thermodynamic magnitudes, specific heats, adiabatic gradient, etc. *Subject Heading:* **Constants.**

1940

2D–16 532/3

Dorsey, Noah Ernest, **Properties of ordinary water-substance in all its phases: water-vapor, water and all the ices.** New York, Reinhold Publishing Corporation, **1940.** 673 p. 13 figs., 289

tables, numerous refs. Comprehensive index. (*American Chemical Society Monograph Series.*) **DWB**—A very complete system of tables and values of physical constants relating to water vapor, fresh and sea water, ice and multiple phase systems (surface tension, solubility of gases, etc., and phase transitions, latent heats, vaporization and condensation, freezing and melting, etc.). A mine of information. *Subject Headings:* **Constants, Ice, Sea water, Water, Water vapor.**

1941

2D–17 53

Birge, Raymond T., **A new table of values of the general physical constants (as of August, 1941).** *Reviews of Modern Physics*, 13:233–239, Oct. **1941. DLC**—The general physical constants as of August 1941 with details on the velocity of light only. *Physical Society, London, Reports on Progress in Physics, (1941)*, 8:90–134, 1942. *Subject Heading:* **Constants.**

2D–18 551.501.4:551.571

Robitzsch, Max, **Einige Ableitungen auf Grund der sogenannten Magnuschen Dampfdruckformel.** [Some deductions from the so-called Magnus vapor pressure formula.] *Meteorologische Zeitschrift*, 58(4):138–144, April **1941.** 2 figs., 4 tables, 3 refs., equations. **DWB**—The values of the constants a and b for water vapor over water and ice in Magnus' formula

$$\log E_t = \frac{a(t_0 - t)}{b + (t_0 - t)} + \log E_{t_0}$$

(E = saturation vapor pressure at temperature t) are discussed. Applications are then suggested to hypsometric calculations, including variation of gravity with latitude and height. *Subject Heading:* **Hygrometry.**

1942

2D–19 551.521.3

Cowling, T. G., **The absorption of water vapour in the far infrared.** *Physical Society, London, Reports on Progress in Physics*, 9:29–41, **1942–43.** tables. **DWB**—Assuming that absorption is given by $A = \mathrm{erf}[\frac{1}{2}\beta(\rho\omega\pi/\rho_0)^{\frac{1}{2}}]$ or roughly $A = \beta\omega^{\frac{1}{2}}$, values of β are given for wave lengths 5.0–152μ. With β less than one, atmosphere always transmits most of corresponding wave length; with β1–3 transmission varies greatly with humidity, with β over 3 there is very little transmission. β varies from 0.24 at 8.6–12.5μ to 15 at 52μ. *Subject Heading:* **Atmospheric absorption.**

2D–20 551.501.3:551.501.6

Egersdörfer, Leonhard, **Einheitliches System meteorologischer Konstanten.** [Uniform system of meteorological constants.] *Meteorologische Zeitschrift*, 59(8):266–267, Aug. **1942. DWB**—Gives constants adopted by the Reichsamt für Wetterdienst for new adiabat diagram paper: gravity ($g_{45,0} = 980.62$), gas constants, molecular weight of water vapor, conversion factors, specific volume, density, etc., and thermodynamic quantities and relations. *Subject Headings:* **Constants, Thermodynamics of the atmosphere.**

2D–21 551.521.3

†*Elsasser, Walter M., **Heat transfer by infrared radiation in the atmosphere.** *Harvard Meteorological Studies*, No. 6, **1942.** 107 p. 34 figs., 123 refs. Atmospheric radiation chart in 2nd ed. **DWB**—A very full discussion. Pt. I gives basic data and definitions. Pt. II describes the structure and absorption of infrared bands. They usually contain a very large number of lines of defined shape, but in some important cases the lines are so far apart that each absorbs independently. Total line absorption is nearly independent of pressure but lines broaden with increasing pressure. Absorption varies with fourth root of absolute temperature. Generalized absorption coefficients for water vapor are given, suitable for meteorological calculations. *Subject Headings:* **Atmospheric absorption, Heat transfer.**

1945

2D–22 551.5(02)

†*Berry, Frederick A., Bollay, E. and Beers, Norman R., **Handbook of meteorology.** New York, McGraw-Hill, **1945.** 1068 p. numerous figs. and tables, biblio. **DWB**—A comprehensive reference book for meteorologists. Section I. **Numerical and graphical data,** by N. R. Beers, p. 1–121, includes mathematical tables, units and their conversion, physical constants, nomograms for gradient wind, rates of ascent of balloons, thermal properties of water, potential temperature, lapse rates, density of air and water vapor, barometer and altimeter corrections, U. S. standard atmosphere, dynamic meters, etc. Section II. **Meteorological mathematics and calculations,** by F. A. Ficken, p. 123–240, deals with constants, variables, functions; methods of computation, including construction of nomograms; elementary geometry, formal algebra, trigonometry, solution of equations,

analytic geometry, differential calculus, integral calculus, etc., vector analysis, mechanics and empirical data including statistical methods. This section is only incidentally meteorological. The remaining sections are more definitely meteorological—III. **Physics of atmospheric phenomena;** IV. **Radiation,** by J. CHARNEY (including Elsasser radiation chart); V. **Meteorological thermodynamics and atmospheric statics,** by N. R. BEERS, with numerous constants and working charts (pseudo-adiabatic temperature diagram, tephigram, emagram, Refsdal aerogram, equivalent potential temperature diagram, etc.); VI. **Kinematics and dynamics of fluid flow,** by H. J. STEWART (including atmospheric oscillations); VII. **The scientific basis of modern meteorology,** by C.-G. ROSSBY; VIII. **Meteorological instruments,** by L. E. WOOD; IX. **Transmission and plotting of meteorological data,** by G. R. JENKINS; X. **Synoptic meteorology and weather forecasting** (8 authors, p. 601–879); XI. **Clouds and states of the sky,** by P. L. SCHERESCHEWSKY; XII. **Climatology,** by H. LANDSBERG (with 50 climographs); XIII. **Hydrometeorology,** by A. S. FRY and A. K. SHOWALTER; XIV. **Oceanography,** by H. U. SVERDRUP. *Subject Headings:* **Constants, Nomograms, Statistical methods, Textbooks.**

1947

2D–23 551.521.3

Albrecht, Fritz, **Eine einheitliche Darstellung des Absorptionsspektrums von wasserdampfhaltiger Luft und flüssigem Wasser.** [A uniform exposition of the absorption spectrum of moist air and liquid water.] *Zeitschrift für Meteorologie,* 1(7):194–196, **1947.** fig. **MH-BH**—Author constructed a diagram, based on a great deal of earlier work including that of HETTNER and FOWLE, of log. absorption against wave frequency, showing a number of nearly equally spaced bands on a sloping line increasing from about 10^{-4} at 0.5μ to 1 above 10μ. Variations in absorption by liquid water are very much less. *Subject Heading:* **Atmospheric absorption.**

2D–24 551.501.3

Temperature interconversion tables (°C.—°F.) and melting points of the chemical elements. *U. S. National Bureau of Standards, Miscellaneous Publications,* No. M.183, **1947.** 4 p. **DBS**—*Subject Headings:* **Conversion tables, Melting points.**

1948

2D–25 551.5:06

International Meteorological Organisation, **Conference of Directors, Washington, 22nd September-11th October, 1947. List of resolutions.** Lausanne, Imprimerie La Concorde, **1948.** 284+p. fold. map. In English and French. **DWB**—Resolution 164, **Values of some physical functions and constants used in meteorology,** gives composition of dry air, molecular weights, units of energy, geopotential, gas constants, saturation vapor pressures, etc. Appendixes include tables of saturation vapor pressure over pure liquid water and over pure ice (°C. and °F.). Resolution 166, **Definitions and specifications of water vapour in the atmosphere,** gives a number of formulas. *Subject Headings:* **Constants, Hygrometry, I.M.O. publications.**

2D–26 551.463.4

Redfield, Alfred Clarence, **Characteristics of sea water.** (In **The Corrosion Handbook,** H. H. Uhlig (ed.), New York, John Wiley, **1948.** p. 1111–1122.) Reprint: *Woods Hole Oceanographic Institution Collected Reprints 1948 (Aug. 1949), Contribution No. 394.* 12 tables. **DLC**—Tables of composition, salinity, density, osmotic pressure, specific conductance. Formulas for artificial sea water. *Subject Heading:* **Sea water.**

1949

2D–27 551.501.3:551.521.12

Ångström, Anders K., **Survey of the activities of the Radiation Commissions of the International Meteorological Organisation and of the International Union of Geodesy and Geophysics.** *Tellus,* 1(3):65-71, **1949. DWB**—Compares Ångström and Smithsonian radiation scales. Ångström uncorrected 100, corrected for edge effect (1922) 101.3. Smithsonian scale 1913, 103.5; 1934, 101.2. Solar Radiation Commission, 1936, 101.0. (*Same item as* No. 2–16 in Feb. 1950, *Meteorological Abstracts.*) *Subject Headings:* **Actinometry, Radiation, IMO, Radiation commission.**

2D–28 53

Childs, William Harold Joseph, **Physical constants, selected for students.** [5th ed.] London, Methuen, [1949]. 77 p. **DLC**—Fundamental units; astronomical, geodetical, chemical and physical constants; hygrometer tables, etc. Includes nomograms of height from barometer readings, barometer correction to 0°C., meniscus correction for mercury columns, density of dry air. *Subject Headings:* **Constants, Units, Nomograms.**

1950

2D–29 551.501.7

Hinkelmann, Karl, **Neuberechnung des thermodynamischen Diagrammes nach Stüve.** [New calculation of Stüve's thermodynamic diagram.] *Germany, Deutscher Wetterdienst in der US-Zone, Mitteilungen*, No. 6, **1950.** 19 p. fig., plate, tables, equations. **MH-BH**—For a new edition of Stüve's diagram, all data, constants, functions and equations were re-calculated. The new constants, etc. are given in detail and the results of the calculations shown in a variety of hygrometric tables. Note especially a new table of saturation adiabatics in terms of temperature and pseudo-potential temperature. *Subject Headings:* **Constants, Thermodynamics of the atmosphere.**

B. TABLES FOR CONVERSION AND REDUCTION

1843

2D–30 551.501.42:551.571

Bone, William, **Mason's hygrometer. A table for obtaining the dew point and moisture by inspection, the degree of the dry bulb being at the head of the column, and that of the wet bulb at the side: opposite the latter will be found the dew point, and moisture.** London, **1843.** 14 p. tables. **DWB**—*Subject Heading:* **Hygrometry.**

1847

2D–31 551.501.42:551.571

Glaisher, James, **Hygrometrical tables to be used with and description of the dry- and wet-bulb thermometers.** 1st ed. London, Richard and John E. Taylor, **1847.** 45 p. fig., tables p. 21–45. **DWB.** 2nd ed. 1856; 7th ed. 1885. **GB-MO**—Tables given for each °F. dry- and wet-bulb: dew point, vapor pressure, vapor content, relative humidity, weight of vapor/cu.ft., with pressure corrections. Based on many thousands of observations with Daniell's dew point hygrometer. Hygrometric tables based on Glaisher's tables were issued by authority of the Meteorological Committee, Great Britain, in 1876 and reprinted 1904. *Subject Heading:* **Hygrometry.**

1871

2D–32 551.501.42:551.571

Trabert, Wilhelm (comp.), **Jelinek's Psychrometer-Tafeln. Anhang. Hygrometer Tafeln von J. N. Pernter.** [Jelinek's psychrometer tables. Append.: Hygrometer tables by J. N. Pernter.] **1871.** 2nd ed. Leipzig, W. Engelmann, 1876. 6th ed. Leipzig, W. Englemann, 1911. 128 p. Anhang. **Psychrometertafeln für drei Windstärkgrade von J. N. Dörr.** [Psychrometer tables for three degrees of wind strength by J. N. Dörr.] 7th ed. Leipzig, Akademische Verlagsgesellschaft, 1929. 131 p. **DWB**—Very detailed tables of vapor pressure in mm. and relative humidity for dry- and wet-bulb by 0.1°C. from −30 to +40°C., with corrections for barometer reading, based on Regnault's formula. *Subject Heading:* **Hygrometry.**

1889

2D–33 551.501.42

Blanford, Henry F., **Tables for the reduction of meteorological observations in India to accompany the "Handbook of instructions to meteorological observers."** Calcutta, India Meteorological Dept., **1889.** 81 p. **GB-MO.** Rev. by G. C. Simpson. Calcutta, 1910. 95+p. **DWB**—Include: reduction of pressure and hygrometric tables, the latter adapted for a mean latitude of 22°, using August's formula as corrected by Regnault. *Subject Headings:* **Barometer reduction, Hygrometry, India.**

1890

2D–34 551.501.42

International Meteorological Committee, **International Meteorological Tables published in conformity with a Resolution of the Congress of Rome 1879.** Paris, Gauthier-Villars et Fils, **1890.** 204+333 p. 68 tables. In French, English and German. **GB-MO**—Includes very detailed tables for: conversion of length, weight, time, geodetical measures (including variation of gravity with latitude and height); conversion of thermometrical scales, reduction of temperature and pressure and calculation of heights by the barometer; hygrometry, rain, evaporation, wind (calculation of resultants and conversion of velocities), magnetism and electricity. All tables are in metric and British units. Although out of date in some respects, the volume is still a mine of information. *Subject Headings:* **International tables, Barometer reduction, Conversion tables, Hygrometry.**

1893

2D–35 551.501

Smithsonian meteorological tables. [Based on Guyot's meteorological and physical tables.] 1st ed. **1893.** 4th rev. ed. *Smithsonian Miscellaneous Collections*, 69(1), 1918. 261 p. 107 tables. **DLC, DSI**—The tables include: conversion of thermometric scales and measures of length, time, angle, weight, wind tables, reduction of temperature to sea level, barometric reduction tables and determination of heights by the barometer, hygrometrical tables (including reduction of snowfall measurements), geodetical (gravity, lengths of meridian and parallel, solar data, duration of twilight, intensity of radiation and illumination) and miscellaneous tables (weight of a cc. of air, absorption and transmission of radiation, etc.). *Subject Headings:* **Tables, Barometer reduction, Hygrometry.**

1906

2D–36 551.501.3:551.55

Simpson, George C., **The Beaufort scale of wind force. Report of the Director of the Meteorological Office upon an inquiry into the relation between the estimates of wind-force according to Admiral Beaufort's scale and the velocities recorded by anemometers belonging to the Office, with a report upon certain points in connection with the enquiry.** London, H.M. Stationery Office, **1906.** 54 p. 9 figs., 17 tables, plate. (Official No. 180.) **DWB**—Table 2 (p. 15) gives mean pressure and velocity of wind for each Beaufort number, limits and gusts. The mean equivalents are expressed by $V = 1.87\sqrt{B^3}$. Probable max. gust also given for each force. Append.: **Beaufort's scale of winds** (G. H. Darwin); **The factor of the Kew pattern Robinson anemometer** (W. H. Dines); **On computing wind force at sea** (Campbell Hepworth). *Subject Heading:* **Beaufort scale.**

1908

2D–37 551.501.42:551.571

Germany. (K.) Preussisches Meteorologisches Institut, **Aspirations- Psychrometer-Tafeln.** [Aspiration thermometer tables.] Brunswick, Friedr. Vieweg, & Sohn, **1908.** 90+p. 2nd rev. ed. 1914. 107 p. refs., equations. Repr. 1927 and 1930. 123 p. **DWB**—Detailed tables in 2nd ed. give saturation vapor pressure −35 to +100°C. and vapor pressure and relative humidity for wet- and dry-bulb in °C. −30.2 to 37.0°C. (over both ice and water below 0°C.), corrections for air pressure, mixing ratio, difference from specific humidity, etc. A table is given for calculation of vapor pressure from readings of a hair hygrometer and air temperature. Introduction gives formulas used [basic formula: v.p. = saturation v.p. at wet-bulb—1/2 (depression of wet-bulb) × bar./755.] *Subject Headings:* **Hygrometry, Germany.**

1909

2D–38 551.571

Scheel, Karl and Heuse, Wilhelm, **Bestimmung des Sättigungsdruckes von Wasserdampf unter 0°.** [Determination of saturation pressure of water vapor below 0°.] *Annalen der Physik*, Ser. 4, 29:723–737, **1909.** 4 figs., tables, 10 refs. **DWB. Bestimmung des Sättigungsdruckes von Wasserdampf zwischen 0° und +50°.** [Determination of saturation pressure of water vapor between 0° and +50°.] *Ibid.*, Ser. 4, 31:715–736, 1910. 5 figs., tables, 14 refs., equations. **DWB**—Pressure of water vapor e saturated in presence of a water surface is given down to −16°C. by $\log_{10} e = 23.55887 - 5\log T - 2925.82/T$; in presence of ice down to −68°C. by $\log_{10} e' = 11.50406 - 0.4 \log T - 2694.2/T$. These tables were used as the basis for the Hygrometric Tables issued by the British Meteorological Office in 1924. *Subject Heading:* **Hygrometry.**

1915

2D–39 551.501

Great Britain. Air Ministry, Meteorological Office, **The computer's handbook.** London, H.M. Stationery Office, **1915–1919.** 2nd ed. 1921. pagination varies. Tables include: Introduction, C.G.S. units of measurement in meteorology with their abbreviations and their equivalents, 1916. 52 p. 2nd ed. 1921. 54 p. **DWB**—Sec. 1, **Computations based on the physical properties of atmospheric air:–humidity and density.** 1916. 33 p. Sec. 2, **The computation of wind components, computation of height and temperature by means of registering balloons, dynamics of the upper air, tables for the estimation of geostrophic winds.** 28+74 p. *Subject Headings:* **Constants, Tables, Barometer reduction, Hygrometry, Upper wind computation.**

1917

2D–40 551.547.1

Jordan, Wilhelm and Hammer, E., **Barometrische Höhentafeln für Luftdrücke zwischen 630 und 765 mm und für Lufttemperaturen zwischen 0° und +35°.** [Barometric height tables for pressures between 630 and 765 mm. and for air temperatures between 0° and +35°.] 3rd ed. Stuttgart,

I. B. Metzler, **1917.** 102+p. **DWB.** Review in *Meteorologische Zeitschrift*, 36:50–51, 1919. **DWB**—For 5–35°C. based on $H=18464(\log 762-\log B)(1+.003665\ t)$. Under $4\frac{1}{2}°$ the last term is $(1+.00388\ t)$. *Subject Heading:* **Barometer reduction.**

1919

2D–41 551.501.42:551.571

Rolf, Bruno, **Tables psychrométriques portatives calculées selon la formule Svensson-Ekholm.** [Portable psychrometric tables calculated from the Svensson-Ekholm formula.] Stockholm, **1919.** 30 p. **DWB**—One of the earliest detailed and accurate psychrometric tables based on the Svensson-Ekholm formula for determining relative humidity from dry-bulb temperature and dew point depression. The first part of the handbook is for temperatures from −10° to +40°C. (over water) and the last part for temperatures +1°C. to −40°C. (over air). The corrections for surface pressures 640 mm. to .820 mm. are given in the margin of each table. *Subject Heading:* **Hygrometry.**—*M.R.*

1921

2D–42 551.501.42:551.511

Doerr, T. N., **Tables of 0.288th powers.** Introduction by L. F. Richardson. *Royal Meteorological Society, Quarterly Journal*, 47(199):196–202, July **1921.** table. **DWB**—0.288 is the ratio of the gas constant to the thermal capacity of unit mass at constant pressure, i.e. $(\gamma_p-\gamma_v)/\gamma_p$. The table gives values of $n^{0.288}$ for values of n of 1070 by units to 50, with differences. *Subject Heading:* **Thermodynamics of the atmosphere.**

1922

2D–43 551.510

Gregg, Willis Ray, **Standard atmosphere.** *U. S. NACA, Report* No. 147, **1922.** 11 p. 4 figs., 6 tables, 11 refs. **DWB**—Tables give pressure (mm., mb., in.), temperature (°C., °A., °F.), vapor pressure (mm., mb., in.) and density (% standard, kg./m³ and lb./ft³) up to 20,000 meters or 65,000 ft. for summer, winter and year, for lat. 40° in U.S.A. Information also shown in diagrams. Other tables give summer, winter and annual densities, pressures and temperatures in different parts of the world computed from Toussant's formula. *Subject Heading:* **Standard atmosphere.**

1924

2D–44 551.501.42:551.571

Great Britain. Air Ministry, Meteorological Office, **Hygrometric tables for the computation of relative humidity, vapour pressure, and dew point from readings of dry and wet bulb thermometers exposed in Stevenson screens.** London, H.M. Stationery Office, **1924.** 25 p. plate. At head of title: M.O. 265. 4th ed. 1940. 45 p. fig. Reprint 1942. **GB-MO**—Gives values of relative humidity, vapor pressure (mb.) and dew point (over ice for wet-bulb below 32°F.) for dry-bulb 140–0°F. and depression of wet-bulb, based on: v.p. = saturation v.p. at wet-bulb temperature −.444 × depression of wet-bulb (.400 for wet-bulb below 32°). Other formulas listed for comparison. Includes a table for negative depression. Append. include dew point over water for temperature below 32°, saturation v.p. over water and ice, etc. *Subject Heading:* **Hygrometry.**

1925

2D–45 551.501.42:551.55

Great Britain. Air Ministry, Meteorological Office, **Wind table to obtain approximately the true force and direction of the wind from its apparent force and direction as observed from the deck of a fast-moving vessel.** 1 leaf. **1925. GB-MO**—*Subject Heading:* **Wind computation.**

2D–46 519.2

Holzinger, Karl, **Tables of the probable error of the coefficient of correlation as found by the product moment method.** Cambridge, University Press, **1925.** 35 p. (chiefly tables). *Tracts for computers*, No. 12. **DLC**—Very detailed tables of the probable errors of coefficients of simple correlation based on 20 to 1000 pairs of observations. *Subject Heading:* **Correlations.**

1926

2D–47 551.510.42:551.571

Köhler, Hilding, **Über Dampfspannungsformeln.** [On vapor pressure formulas.] *Meteorologische Zeitschrift*, 43(2):67–69, Feb. **1926.** table, 5 refs., equations. **DWB**—Comparison of vapor pressure formulas by Kirchoff and Clapeyron with that of Magnus for temperatures −65 to +50°C. Good agreement at temperatures important for meteorology. *Subject Heading:* **Hygrometry.**

2D–48 551.5017.

Tetens, Otto and Duckert, Paul, **Tafeln zur Auswertung von Pilotballonen Beobachtungen.** [Tables for the evaluation of pilot balloon observations.] *Preussisches Aeronautisches Observatorium Lindenberg, Arbeiten*, 15:308–355, **1926.** 9 tables, diagrams. **MH-BH**—Detailed trigonometric tables adapted for calculating winds from pilot balloons followed by two theodolites. *Subject Heading:* **Upper wind computation.**

1928

2D–49 551.501.42:551.521.12

Amiable, J. V., **Formules et tables pour calculs actinométriques.** [Formulas and tables for actinometric calculations.] *Tunis, Service Botanique*, 5(2):103–125, **1928.** 4 tables. **DWB**—This compilation gives in considerable detail: zenith distances and atmospheric masses for lat. 36°49′N for each day and hour; atmospheric masses as a function of zenith height, after Bemporad, to 10ths of a degree; time of passage of sun through meridian; times of sunrise and sunset at Tunis. *Subject Headings:* **Actinometry, Air mass.**

2D–50 519.2

Wishart, John, **Table of significant values of the multiple correlation coefficient.** *Royal Meteorological Society, Quarterly Journal*, 54:258–259, July **1928.** 2 tables. **DWB**—Gives tables of 5% and 1% significance points for multiple correlation coefficients with 2–6 independent variables and 1–100 degrees of freedom. *Subject Heading:* **Correlations.**

1929

2D–51 551.501.42:551.571

Tashkent. Meteorological Institute for Middle Asia, **Tablitsy dlia vychesleniia nedostatka nasyshcheniia.** [Tables for evaluating hygrometric deficit.] Tashkent, **1929.** 20 p. **GB-MO**—Tables give saturation deficit in mm. for absolute humidity and dry bulb °C. *Subject Headings:* **Hygrometry, Saturation deficit.**

1930

2D–52 517.512.2

Bartels, Julius, **Bemerkungen zur praktischen harmonischen Analyse.** [Remarks on practical harmonic analysis.] *Beiträge zur Geophysik*, 28:1–10, **1930.** 3 figs., table, equations. German and English summaries p. 1. **DLC**—Formulas and a table are given for harmonic analysis of equidistant ordinates, and applied to mechanical analysis. An analysator is described. *Subject Heading:* **Harmonic analysis.**

1931

2D–53 551.501.42

Heidke, P., **Zur Form von Tabellen und Rechentafeln.** [On the form of tables and calculating tables.] *Annalen der Hydrographie und Maritimen Meteorologie*, 59:345–349, **1931.** 2 tables. **DLC**—Contains suggestions for making tables easy to work with and suggestions for lessening the risk of error. *Subject Heading:* **Tables.**

2D–54 551.501.3:551.551

Lange, K. O., **Die Darmstädter Böigkeitsskala.** [The Darmstadt gustiness scale.] *Beiträge zur Physik der freien Atmosphäre*, 17:89–101, **1931.** 8 figs., 2 tables. **DLC**—Gives details of an improved scale of turbulence, b_0–b_3, and some illustrative records. *Subject Heading:* **Gusts.**

1932

2D–55 551.501.42:551.571

U. S. Weather Bureau, **Relative humidity—centigrade temperatures.** Washington, D. C., Govt. Printing Office, **1932.** 14 p. **DWB**—Tables of R. H. for temperatures by 1° and depression of wet bulb by 0.1° from −39 to +44°C. at 29.24 in. with corrections for other pressures. *Subject Heading:* **Hygrometry.**

1933

2D–56 551.501.3

Johansson, Oscar Vilhelm, **Die Beaufortskala in einfachen Formeln und Gedächtnisregeln.** [The Beaufort scale in simple formulas and mnemonics.] *Helsinki University, Meteorologian laitos, Mitteilungen*, No. 23, **1933.** 26 p. **DWB.** *Societas Scientiarium Fennica, Commentationes physico-mathematicae*, 6(24), **1933.** 26 p. 4 tables. **DLC**—Gives a table of equivalents in m./sec. of

Beaufort forces 0–12 according to 13 different evaluations in various countries. Also, assuming that velocity v can be represented by $v=a+bn+cn^2$, where n is Beaufort force, gives for each evaluation a, b, c, first and second differences, etc. The types of formula are discussed and formulas for upper limit of each number (instead of mean velocity equivalent) are derived. *Subject Heading:* **Beaufort scale.**

1934

2D–57 551.510

Galmarini, Alfredo G., **La atmosfera "standard." Antecedentes, definición, fórmulas y tablas.** [Standard atmosphere. Origins, definition, formulas and tables.] *Argentine Republic, Dirección de Meteorología Geofísica e Hidrología, Ser. A*, No. 2, **1934.** 29 p. plate, tables. **DLC**—Following the history of the "standard atmosphere" in different countries, the definition and physical constants of the C.I.N.A. standard are set out. The graph gives for heights H up to 19 km. curves of density $\left[0.12497\left\{\frac{288-.0065H}{288}\right\}^{4.256}\right]$, pressure $\left[760\left(\frac{288-.0065H}{288}\right)^{5.256}\right]$ and temperature $[15-.0065H$ up to 11 km., then constant]. The tables give pressure, temperature, density and their differences and ratios for heights of −350 to 25,000 meters. *Subject Heading:* **Standard atmosphere.**

2D–58 551.501.42:551.571

Harrison, Louis P., **Tables (in millibars) of the "pressure of saturated aqueous vapor over water" at temperatures from 0° to −50°C.** *Monthly Weather Review*, 62:247–248, July **1934.** 2 tables. **DWB**—Gives also ratio of pressure of saturated vapor over water and over ice. *Subject Heading:* **Hygrometry.**

2D–59 551.501.42:551.593.55

Lugeon, Jean, **Tables crépusculaires donnant l'altitude au zénith des rayons rasants du soleil pour toutes les latitudes de degré en degré.** [Crepuscular tables giving the altitude at the zenith of tangential rays from the sun for all latitudes, degree by degree.] Warsaw, Drukarnia Państwowego Instytutu Meteorologicznego, **1934.** 438+p. 10 figs., equations. **DWB**—*Subject Heading:* **Twilight.**

2D–60 551.501.42:551.571

Osborne, Nathan S. and Meyers, Cyril H., **A formula and tables for the pressure of saturated water vapor in the range from 0 to 374°C.** *U. S. National Bureau of Standards, Journal of Research*, 13:1–20, July **1934.** 4 figs., 8 tables. Summary p. 1. **DBS**—A complex formula is developed giving saturation pressure in international atmospheres in terms of absolute temperature. Deviations (in mm. vapor pressure) from various observed and adjusted values −15 to 120°C. are shown in detail; between 0 and 50°C. they do not exceed .05 mm. Tables give values by 1°C. from −5°C. upwards of saturated vapor pressure in standard atmospheres and kg./cm.², and derivatives, and for °F. in lb./in.². *Subject Heading:* **Hygrometry.**

1935

2D–61 551.510:551.547

Brombacher, W. G., **Altitude pressure tables for calibrating altimeters and computing altitudes based on the United States standard atmosphere.** *U. S. NACA, Report* No. 538, **1935.** 14 p. Summary p. 1. **DWB**—Altitude pressure tables given in *NACA Technical Report* No. 246 (1926) are extended to 80,000 ft. They give altitudes in feet at pressure intervals of 0.1 or 0.2 mm. and 0.01 inch Hg. and pressures in mm. and in., and air temperature °C. for every 500 ft. or 1000 ft. interval; also mean temperatures of column up to 50,000 ft. *Subject Heading:* **Standard atmosphere.**

2D–62 551.501.42:551.521.3

Wirtz, C., **Tafel der Weglängen in der homogenen Atmosphäre nach Argument wahre Zenitdistanz.** [Table of path lengths in the homogeneous atmosphere according to true zenith distance.] *Annalen der Hydrographie und Maritimen Meteorologie*, 63(6):240–241, June **1935.** fold. table, ref. **DWB**—Detailed table of proportional length of path of rays in a homogeneous atmosphere for zenith distance 0–90.5°, with corrections for refraction, pressure and temperature. *Subject Headings:* **Actinometry, Air mass.**

1936

2D–63 551.501.3(26)

Kuhlbrodt, Erich and Leistner, W., **Vergleich geschätzter Windstärken mit gemessenen Windgeschwindigkeiten auf See. Ein Beitrag zur Frage der Geschwindigkeits-Äquivalente der Beaufort-Skala nach Beobachtungen der "Meteor"-Expedition 1925 bis 1927.** [Comparison of

estimated wind forces with measured wind velocities at sea. A contribution to the question of the velocity-equivalent of the Beaufort scale from observations on the "Meteor" expedition 1925 to 1927.] *Annalen der Hydrographie und Maritimen Meteorologie*, 64, 2 Köppen-Heft:14–23, 1936. 3 figs., fold. plate, 4 tables. **DWB**—Observations on "Meteor" showed that estimated wind forces in the open ocean are systematically lower than on the coast and correspond to higher wind speeds than the international scale by 0.8–1.2 m./sec. Tables of equivalents given. *Subject Heading:* **Beaufort scale.**

1937

2D–64 551.501.4:551.593.63

Lennahan, Charles M., **Tables for the computation of halos.** *Monthly Weather Review*, 65:7–8, Jan. 1937. 3 tables. **DWB**—Tables give virtual indexes and critical angles in oblique prismatic refraction and "Law of refraction" $\mu = 1.31$. No text. *Subject Heading:* **Halos.**

1938

2D–65 551.501.7:551.547

Cannegieter, H. G. and Bleeker, W., **Tabellen zur Ermittlung von Druckwerten in geodynamischen Stufen aus denen in geometrischen Höhen und umgekehrt.** [Tables for evaluating pressures in geodynamic steps from those in geometric heights and vice versa.] *Beiträge zur Physik der freien Atmosphäre*, 24:18–25, 1938. 7 tables. **DWB**—Tables give the pressure differences between heights in geodynamic and geometric meters in lat. 51° for ranges of pressure (mb.) at geometric height and virtual temperature °C. of the correction layer. A subsidiary table gives corrections for lats. 43–59°. *Subject Heading:* **Upper air pressure.**

1939

2D–66 551.501.42:551.547

Robitzsch, Max, **Ausführliche barometrische Reduktions- und Höhentafeln.** [Extensive barometric reduction and height tables.] Leipzig, W. Keller, 1939. 64 p. tables. **DWB**—Includes tables for reduction of a mercury barometer, evaluation of height formula and tables by mb. for determining height in geodynamic and geometric meters (isothermal atmosphere at 0°C. with corrections for temperature). Corrections for variation of gravity and for vapor content are included. *Subject Heading:* **Barometer reduction.**

1941

2D–67 551.501.42:551.571

Marvin, Charles Frederick, **Psychrometric tables for obtaining the vapor pressure, relative humidity, and temperature of the dew point; from readings of the wet and dry bulb thermometers.** U. S. Weather Bureau, 1941. 87 p. tables. **DWB**—Based on Ferrel's formula $e = e' - .000367P(t - t')\left(1 + \frac{t' - 32}{1571}\right)$. Gives for air temperature −40 to 140°F., pressure 30 to 23 in., values of dew point, saturation v.p. and relative humidity. Also weight of a cu.ft. of water vapor at different temperatures and humidities. *Subject Heading:* **Hygrometry.**

2D–68 551.510

Pankhurst, R. C. and Conn, J. F., **Physical properties of the standard atmosphere.** *Aeronautical Research Committee, Reports and Memoirs*, London, No. 1891, 1941. 1+5 p. tables. **GB-MO**—Gives for the ICAN standard atmosphere a table by 1000 ft. of temperature T in °C., velocity of sound and ratio to velocity at 0 ft., pressure p in lb./ft.^{2} and mb. and ratio p/p_0, density ρ in slug/ft.^{3} and ρ/ρ_0, $(\rho/\rho_0)^2$, viscosity and coefficient of kinematic viscosity. The fundamental equations are set out in full. *Subject Heading:* **Standard atmosphere.**

2D–69 551.501.42:551.571

Robitzsch, Max, **Ausführliche Tafeln zur Berechnung der Luftfeuchtigkeit.** [Extensive tables for calculation of atmospheric humidity.] Leipzig, W. Keller, 1941. 67 p. Review in *Meteorologische Zeitschrift*, 58:303, 1941. **DWB**—These extensive tables are based on a formula for v.p. over ice and water by Tetens (*Zeitschrift für Geophysik*, 6, 1930) which agrees with the latest measurements. Over supercooled water they are calculated by $\log E(\text{ice}) - \log E(\text{water}) = .00418\ t$. Tables include vapor pressure (mm. and mb.) and dew point. *Subject Heading:* **Hygrometry.**

1942

2D–70 551.501.42:551.511

Chicago. University. Institute of Meteorology, **A table of potential temperature for ranges of pressure and temperature ordinarily encountered in the atmosphere. (Based on Ballard's**

table of factors.) Chicago, **1942.** 30 p. tables. **DWB**—The tables are not clear and no explanation is given. *Subject Headings:* **Thermodynamics of the atmosphere, Potential temperature.**

2D–71 551.501.42:551.571

London. Institution of Heating and Ventilating Engineers, **Tables of hygrometric data for air conditioning calculations as embodied in the Guide to Current Practice issued to its members.** London, Whitefriars Press, **1942.** 70 p. tables, nomogram. **GB-MO**—Following a list of symbols, data and formulas, tables give for temperatures of 30 to 136°F., R.H.100 to 0, vapor pressure in mb., dew point °F., moisture in grains, total heat B.Th.U., volume in cu.ft. per lb. or dry air and wet bulb °F. in screen and sling. *Subject Headings:* **Air conditioning, Hygrometry.**

2D–72 551.501.42:551.571

Rao, K. Nagabhushana, **Saturation temperature tables.** India, Meteorological Dept., Poona, **1942.** 30 p. 2 figs. **GB-MO**—Text gives constants used and fundamental formulas. Tables give: saturation temperatures (i.e. dew/frost points) °A. for air temperature 230–317°A. pressure 1000–300 mb.; and saturation potential temperatures (temperature of point of intersection of saturation adiabat, passing through condensation point, with standard isobar of 1000 mb.) for given values of potential temperature and mixing ratio. PETTERSSEN terms these quantities pseudo wet bulb and potential pseudo wet bulb. *Subject Headings:* **Hygrometry, Thermodynamics of the atmosphere.**

1943

2D–73 551.501.45:551.524.32

Brooks, C. E. P., **Interpolation tables for daily values of meteorological elements.** *Royal Meteorological Society, Quarterly Journal,* 69(300):160–162, April **1943.** table. **DWB**—Gives a method of calculating daily values, or date of occurrence of any given value, from monthly means on the assumption that 3 successive months can be represented by a sine curve with annual period. *Subject Heading:* **Interpolation.**

2D–74 551.501.42:551.511

Germany. Reichsamt für Wetterdienst, **Tabellen der pseudopotentiellen Temperatur.** [Tables of pseudo potential temperature.] Berlin, **1943.** 8 p. 15 tables. **GB-MO**—A small table gives condensation temperature −40 to +40°C., R.H. 20–100%. The main tables give pseudopotential temperature for air temperature −40 to +40, R.H. 0–100, pressure 1000–500 mb., with a correction table for use between 1050 and 950 mb. *Subject Headings:* **Thermodynamics of the atmosphere, Potential temperature.**

2D–75 551.501.7:551.547

U. S. Weather Bureau, **Tables for computing heights of constant pressure surfaces. 1943.** 49 p. **DWB**—The tables include: temperature correction (sum of lapse rate and humidity corrections) to give the mean virtual temperature for reduction to 1000 and 850 mb. and tables of z for computing height of 1000 and 850 mb. constant pressure surfaces (1070–700 and 850–700 mb.). *Subject Heading:* **Upper air pressure.**

1944

2D–76 551.501.42

Johansson, Oscar Vilhelm, **Zur Methodik der Zahlen- und Tabellenbehandlung in meteorologischen Beispielen.** [On the methods of handling figures and tables in meteorological examples.] *Helsinki, University, Meteorologian laitos, Mitteilungen,* No. 54, **1944.** *Societas Scientiarum Fennica, Commentationes physico-mathematicae,* 12(4), 1944. 40 p. tables and diagrams. **DWB**—Sets out methods of dealing with the great mass of meteorological data, simple formulas for conversion of units and other arithmetical calculations, simplified pressure reductions and psychrometer tables. Describes different methods of making tables, e.g., Beaufort scale, maximum vapor pressure, black body radiation, condensation level, and frequency distributions. *Subject Heading:* **Tables.**

1945

2D–77 551.501.42:551.571.7

Great Britain. Air Ministry, Meteorological Office, **Tables for obtaining values of relative humidity of the air from readings of an aircraft aneroid barometer and aircraft psychrometer in degrees Fahrenheit.** Form 2628, [**1945**]. 1 p. 8 tables. **GB-MO**—Gives relative humidity for dry bulb and depression of wet for pressures of 1000 to 300 mb. For dry bulb below 32°, humidity refers to a plane surface of ice. **Tables for obtaining the absolute humidity of the air from the dry-bulb temperature and relative humidity.** Form 2629 [1945], 1 p. 5 p. tables. Gives humidity in gm./m.^{3} for dry bulb −60 to +120°F. Below 32° humidity refers to ice. *Subject Headings:* **Hygrometry, Upper air humidity.**

2D–78 551.501.42

Tablas meteorológicas. [Meteorological tables.] *Spain, Servicio Meteorológico Nacional, Publicaciones, Ser. C,* No. 14, **1945.** 11 tables. **GB-MO**—A selection of cards in a folder giving: variation of gravity with height and latitude; virtual temperature of saturated air; conversion mm. to mb.; height difference in gdm. between pressure contours, with supplementary interpolation tables; height of any pressure level above station and above 1100 mb. in gdm., with supplementary temperature corrections; specific volume of air at standard pressure levels. *Subject Heading:* **Tables.**

2D–79 551.501.42

Tablas psicrométricas. Tablas barométricas. [Psychrometric tables. Barometric tables.] *Spain, Servicio Meteorológico Nacional, Publicaciones, Ser. C,* No. 15, **1945.** 22 p.; No. 16, 1947. 20 p. **GB-MO**—*Subject Headings:* **Barometric reduction, Hygrometry.**

1947

2D–80 517.512.2

Pollak, Leo Wenzel, **Harmonic analysis and synthesis schedules for three to one hundred equidistant values of empirical functions.** *Eire, Dept. of Industry and Commerce, Meteorological Service, Geophysical Publications,* 1, **1947.** 118 p. 17 refs. **Eight-place supplement to harmonic analysis and synthesis schedules for three to one hundred equidistant values of empiric functions.** *Ibid.,* 1(1,2), 1949. n.p. **DWB**—Very detailed tables giving, to 5 decimals (8 in supplements), cosines and sines required in the harmonic analysis of any number of terms (first harmonic only). *Subject Heading:* **Harmonic analysis.**

2D–81 551.510.53 551.501.7

Warfield, Calvin N., **Tentative tables for the properties of the upper atmosphere.** *U. S. NACA, Technical Note* No. 1200, **1947.** 50 p. 6 plates, biblio. p. 35–36. Summary p. 1–2. **DWB**—Table 1 gives a variety of properties of the atmosphere at sea level according to different standards. Tables 2 and 3 give absolute pressure and temperature, density, specific weight, coefficient of viscosity, kinematic viscosity, speed of sound, mean free path of molecules for heights of 20–120 km. (mean, day, night). Tables 4 and 5 give for same heights the properties for tentative standard temperature based on an inverse square variation of gravity with latitude corrections. The plates show these data graphically. *Subject Heading:* **Standard atmosphere.**

1948

2D–82 518

Schumann, Theodor Eberhardt Werner, **Mathematical tables for fitting polynomials to an evenly-spaced series of data.** Union of South Africa, Meteorological Office, **1948.** **GB-MO**—Tables give the least squares fit of an Nth degree polynomial to n values of y for evenly spaced values of x. Equation fitted is

$$y' = \sum_{s=0}^{N} a_s x^s \quad \text{where } (y - y')^2 \text{ is a minimum.}$$

Subject Heading: **Curve fitting.**

1949

2D–83 551.501.42

British East Africa. Meteorological Dept., **Table for obtaining dew point (°F.) from dry-bulb temperature (TT) and coded relative humidity (UU). Tables for deriving dew point from dry bulb and departure of wet bulb (1200 gdm.). Tables for North and East components. Tables for the reduction of pressure to mean sea level.** O.M. No. 10, 12, 13, 15, Nairobi, [1949]. **GB-MO**—*Subject Headings:* **Hygrometry, Barometer reduction, Tables.**

2D–84 551.501.3:551.571

Goff, John A., **Final report of the Working Sub-Committee of the International Joint Committee on Psychrometric Data.** *American Society of Mechanical Engineers, Transactions,* 71:903–913, **1949.** 14 tables, biblio. p. 912–913. **DLC**—Gives recommended values for composition of dry air, molecular weights, physical constants and relations, tables of zero pressure properties of dry air and water vapor, saturation pressures (ice, liquid water, supercooled liquid), enthalpy and entropy of moist air, etc. *Subject Heading:* **Thermodynamics of the atmosphere.**

2D–85 551.501.42:551.571.7

Great Britain. Air Ministry, Meteorological Office, **Humidity mixing ratio tables.** London, **1949.** 13 p. Duplicated. Prepared by M.O. 18. **GB-MO**—Designed for use in punching Hollerith cards, the tables give for various pressures 1000–300 mb. the approximate humidity

mixing ratios at different temperatures and relative humidities. For surface data (1050–940 mb.) a supplementary table of equivalent temperatures is given. *Subject Headings:* **Hygrometry, Mixing ratio, Punched card methods.**

2D–86 517.512.2

Pollak, Leo Wenzel, **All term guide for harmonic analysis and synthesis using 3 to 24, 26, 28, 30, 34, 36, 38, 42, 44, 46, 52, 60, 68, 76, 84 and 92 equidistant values.** *Eire, Dept. of Industry and Commerce, Meteorological Service, Geophysical Publications*, 2, 1949. 185 p. **DWB**—Detailed tables of cos. and sin. *iz* to 5 decimal places. (*Same item as* No. 8–11 in Aug. 1950, *Meteorological Abstracts.*) *Subject Headings:* **Computation tables, Harmonic analysis.**

C. COMPUTING DIAGRAMS, NOMOGRAMS, SLIDE RULES

1918

2D–87 551.501.7:551.557

Bolton, C. Percival, **Computation of wind velocity from pilot balloon observations.** *Royal Meteorological Society, Quarterly Journal*, 44(185):31–40, Jan. 1918. 5 figs., table. **DWB**—Describes a method of calculating successive positions of a single theodolite pilot balloon by solving triangles, by means of a graduated diagram, or by a special slide rule; with applications to 2-theodolite and tail methods. *Subject Headings:* **Slide rules, Upper wind computation.**

1919

2D–88 551.501.7:551.547:681.14

Fessler, A., **Ein einfaches mechanisches Verfahren zur schnellen Berechnung von Isobarenkarten in beliebig vielen Niveaus.** [A simple mechanical method for rapid computation of isobaric charts in any number of levels.] *Meteorologische Zeitschrift*, 36(9–10): 254–257, Sept.–Oct. 1919. 4 figs. **DWB**—Describes a slide rule for calculation of pressure at any height, based on log b_1 −log $b_2 = gh$ log $e/[R(273+t_m)]$. A correction is introduced for virtual temperature. Part of the slide is adapted for separate height intervals of 100, 200 . . . 3000 m. *Subject Headings:* **Slide rules, Upper air pressure.**

1920

2D–89 551.501.7:551.557

Dines, John Somers, **Methods of computation for pilot balloon ascents.** *Great Britain, Meteorological Office, Professional Notes*, 1(10):149–164, 1920. 7 figs. At head of title: M.O.240j. **GB-MO**—Describes methods adopted for single theodolite observations in France, Italy, U. S. and Great Britain and suggested modifications. Graphical and slide rule methods are set out for double theodolite and tail observations. *Subject Headings:* **Slide rules, Upper wind computation.**

2D–90 551.501.6:551.524.7

Giblett, Maurice A., **A nomogram for obtaining the mean temperature of an air column from the pressure at the top and bottom.** *Royal Meteorological Society, Quarterly Journal*, 46(196):431–432, Oct. 1920. fig. **DWB**—Devised for obtaining the harmonic mean temperature of the air column between Puy-de-Dome (1.5 km.) and sea level. Vertical lines for temperature and upper pressure (linear scales) are crossed by sloping lines for sea level pressure and a sloping datum curve. The principle is of more general application. *Subject Headings:* **Nomograms, Upper air temperatures.**

1921

2D–91 551.501.6:551.547.2

Schwerdt, Hans G. and Loebe, W. W., **Eine nomographische Tafel zur Luftdruckreduktion.** [A nomographic plate for pressure reduction.] *Meteorologische Zeitschrift*, 38:139–142, May 1921. 2 figs. **DWB**—The nomogram gives horizontal scales of virtual temperature °C. and pressure reduced to sea level in mm. A vertical scale gives height above M.S.L. in meters against a series of horizontal pressure scales. By setting a rule from virtual temperature across station pressure, M.S.L. pressure is read off on bottom scale. *Subject Headings:* **Barometer reduction, Nomograms.**

1923

2D–92 551.501.42:551.571

Coleman, G. S., **Calculations in heating and ventilating.** London, Longmans, Green & Co., 1923. 255 p., 52 figs. **GB-MO**—Chap. 20, **Water vapor** and Chap. 21, **Humidity control,** contain tables and charts relating to humidity. *Subject Headings:* **Air conditioning, Hygrometry.**

2D–93 551.501.6:551.501.7

Shaw, Sir William Napier, **Logarithmic paper.** *Meteorological Magazine, London,* 58(12):281–283, 1923 (Jan. 1924). fig. **MH-BH**—Description and illustration of logarithmic paper adapted for plotting temperature against pressure in sounding balloon ascents. *Subject Heading:* **Aerological diagrams.**

1924

2D–94 551.501.6:551.55

Haines, William C., **Graphical method of compounding vectors.** *Monthly Weather Review,* 52:491–492, Oct. **1924.** plate. **DWB**—Describes a plotting board and protractor for adding vectors by compounding parallelograms. Gives resultant winds. *Subject Heading:* **Wind computation.**

2D–95 551.501.7:551.57

Kreitmeyer, Eduard, **Einige graphische Darstellungen auf Grund neuerer physikalischer Werte.** [Some graphical expositions based on recent physical data.] *Meteorologische Zeitschrift,* 41(12):380–388, Dec. **1924.** 5 figs. **DWB**—Gives diagrams of specific humidity (temperature: pressure); absolute humidity (gm./m.^{3}, temperature: vapor pressure); dew point (temperature: R. H.); pressure reduction to M.S.L.; hail stage; adiabatics. *Subject Headings:* **Adiabatics, Aerological diagrams, Upper air humidity.**

1925

2D–96 551.501.6:551.571

Fjeldstad, Jonas Ekman, **Graphische Methoden zur Ermittlung adiabatischer Zustandsänderungen feuchter Luft.** [Graphical methods of evaluating adiabatic changes of state of moist air.] *Geofysiske Publikasjoner,* 3(13), **1925.** 25 p. 8 plates, 5 tables. **DWB**—The various stages of ascending air are defined—dry stage, rain stage, hail stage and snow stage. Adiabatic and pseudo-adiabatic processes are discussed and tables of vapor pressure and condensation factor set out. A graph is given in sections—horizontal isobars, vertical isotherms and sloping adiabats. *Subject Headings:* **Adiabatics, Aerological diagrams, Upper air humidity.**

1926

2D–97 551.501.6:551.501.7

Woolard, Edgar W., Samuels, Leroy T. and Stevens, Welby R., **Graphical thermodynamics of the free air.** *Monthly Weather Review,* 54:454–457, **1926.** 2 plates. **DWB**—Describes and illustrates use of fig. 1, an "adiabatic chart" with coordinates log p(t°C. and height) giving also wind velocity and direction, vapor pressure, specific humidity and dry adiabatic (potential temperature). Fig. 2 is a tephigram. *Subject Headings:* **Adiabatics, Aerological diagrams, Tephigrams, Upper air humidity.**

1927

2D–98 551.501.6:551.547

Mézin, Maurice, **Une méthode graphique pour le calcul des altitudes par la formule de Laplace dans le dépouillement des diagrammes des ballons-sondes.** [A graphical method of calculating heights by the formula of Laplace in working up balloon-sonde diagrams.] *La Météorologie,* 3:312–314, 1927; 4:371–372, 1928. 2 figs. **DWB.** Remarks by Peregrin Zistler in *Meteorologische Zeitschrift,* 45:109–111, 1928. **DWB**—Fig. 1 is a "trapeze" of mean temperature and difference of altitude to be used with a transparent scale of pressures. Fig. 2 gives the logarithmic pressure scale. Claimed to be very rapid. *Subject Heading:* **Barometric reduction.**

1928

2D–99 551.501.4:551.571

Poulter, R. M., **Simple formulae for computing relative humidity from readings of the dry and wet bulb thermometers.** *Royal Meteorological Society, Quarterly Journal,* 54(288):287–291, Oct. **1928.** fig., 2 tables. Discussion p. 291. **DWB**—Gives the approximate expression for the British Isles: relative humidity $100-1000d/3T$ (summer) or $100-350d/T$ (winter), T=dry bulb °F., d=depression of wet. In the discussion, D. Brunt showed how these could be plotted as straight line diagrams. See also: Palumba, Luisa, **Formule semplice per calcolare l'umidita relativa,** *Bollettino Bimensuale,* 48:2–5, 1929, 3 figs., 2 tables. *Subject Heading:* **Hygrometry.**

1929

2D–100 551.501.6

Lorente, José-María, **Nomografía y meteorología.** [Nomography and meteorology.] *Sociedad Española de Meteorología, Anales,* 3:85–86, **1929.** **DWB**—Shows briefly how nomograms can be used in meteorology. Example, vapor pressure. *Subject Heading:* **Nomograms.**

2D–101 551.501.6:551.571

Pita Suárez-Cobián, Pío, **Nuevo método gráfico para calcular la tensión del vapor de agua.** [New graphic method of calculating the tension of water vapor.] *Sociedad Española de Meteorología, Anales*, 3:80–81, 1929. fold. plate. English summary p. 80. **GB-MO, DWB**—A nomogram is given for calculating vapor pressure (mm. or mb.) from dry- and wet bulb temperature at different pressures in mm. *Subject Headings:* **Hygrometry, Nomograms.**

1930

2D–102 551.501.6:551.573

Cummings, N. W., **Alignment diagram for "R" of the energy-evaporation equation.** *Monthly Weather Review*, 58(4):142–144, April, 1930. fig., tables. **DWB**—R is the ratio of the sensible heat swept away by the wind to the latent heat of evaporation. BOWEN showed that it can be calculated from $R = .46 \frac{Tw - Ta}{Pw - Pa} \cdot \frac{B}{760}$ where Tw, Ta are the temperatures of water surface and dry bulb, Pw is saturation vapor pressure at Tw, Pa absolute humidity in mm. and B air pressure. Diagram gives greatest possible value of R in terms of air temperature. *Subject Headings:* **Bowen's ratio, Evaporation.**

2D–103 551.501:551.511

Shaw, Sir William Napier, **Manual of meteorology. Vol. III. The physical processes of weather.** Cambridge, University Press, 1930. 445 p. 149 figs., tables. **DWB**—Includes a number of values of constants, units, absorption spectra, etc. Chap. 6, **Air as worker** and Chap. 7, **The liability of the environment,** contain various diagrams and tables representing the state of the air, especially on the basis of entropy, including the tephigram and "liability diagram" (difference between energy developed in the saturation adiabatic and that required to lift the air in the vertical represented by the tephigram). *Subject Headings:* **Aerological diagrams, Constants, Tephigrams, Units.**

1931

2D–104 551.501.6

Bartels, Julius, **Geophysical stereograms.** *Terrestrial Magnetism and Atmospheric Electricity*, 36:187–198, 1931. 2 figs.+10 stereograms. Summary p. 187. **DLC**—Formulas and practical rules are given for constructing stereograms for 3-dimensional representation of geophysical phenomena. The examples are mainly magnetic but one shows upper air currents at Samoa. Some of them bring out novel points. *Subject Heading:* **Stereograms.**

1932

2D–105 551.501.6:551.511

Moese, Oskar, **Grafische Tafeln zur Berechnung äquipotentieller Temperaturen ($\theta' - 273$) für aerologisch-synoptische Zwecke.** [Graphical diagrams for calculating equipotential temperatures ($\theta' - 273$) for aerological synoptic purposes.] Breslau-Krietern, 1932. 1 p. 11 dupl. charts. **GB-MO**—A group of diagrams on squared paper for calculating θ' for values of relative humidity by 10% steps from $\theta' = (T + 1570\ e/p)(p/1000)^{0.2884}$. *Subject Headings:* **Aerological diagrams, Potential temperature.**

2D–106 551.501.6:551.571

Tikhty, O. N., **Psikhrometricheskaia nomogramma.** [Psychrometric nomogram.] *Glavnaia Geofizicheskaia Observatoriia, Izvestiia*, Leningrad, No. 4:38–41, 1932. 2 figs. English summary p. 41. **DLC**—Gives small scale reproductions of a nomogram for absolute and relative humidity from readings of an August psychrometer. *Subject Headings:* **Hygrometry, Nomograms.**

1933

2D–107 551.501.6:551.511

Hartung, K., **Einfache thermodynamische Betrachtungen am Tephigramm.** [Simple thermodynamic considerations on the tephigram.] Synoptische Bearbeitungen, Linke-Sonderheft, Frankfurt, 1933. p. 60–64. 2 figs. **GB-MO**—A brief discussion of the information about a quantum of air to be derived from the tephigram. *Subject Headings:* **Aerological diagrams, Tephigrams.**

2D–108 551.501.6

Thomas, H., **Nomogramme zur Bestimmung der Sonnenhöhe bei beliebiger geographischer Breite sowie der Äquivalenttemperatur und spezifischen Feuchtigkeit.** [Nomograms for determining the solar height in any geographical latitude, also the equivalent temperature and specific humidity.] *Meteorologische Zeitschrift*, 50:369–374, 1933. 8 figs., 3 tables. **DWB**—Describes con-

struction of nomograms in detail, with working tables. The first connects a sliding scale of sin h (sun's height) with cos ϕ (lat.), 2 $\sin^2(t/2)$ (t=hour angle) and sec δ (declination). The second connects $\phi - \delta$ with t and h. A third gives correction to hour angle for hour angle, relative humidity and pressure. *Subject Headings:* **Hour angle, Nomograms, Sun's height.**

1934

2D–109 551.501.6:551.557

Berg, E., **Nomogramme zur Ermittlung des Gradientwindes aus Karten der Topographie bestimmter Isobarenflächen.** [Nomogram for evaluating gradient wind from charts of the topography of defined isobar surfaces.] *Germany, Reichsamt für Wetterdienst, Erfahrungsberichte*, 8(18):153–155, **1934.** fig. **DLC**—Gives logarithmic diagram of v (m./sec.) against height of level in gdm./distance apart of isohypses, lat. 10–90°. *Subject Headings:* **Nomograms, Upper wind computation.**

2D–110 551.501.4:551.511

Müller, H., **Ein Schieber zur Berechnung der äquipotentiellen Temperatur.** [A slide rule for calculating equipotential temperature.] *Annalen der Hydrographie und Maritimen Meteorologie*, 62:292–296, **1934.** fold. plate. **DLC**—Describes and illustrates construction of a slide rule which carries also relative humidity, pressure, specific humidity, and temperature °C. Equivalent potential temperature $\theta_A = \frac{RE}{100p/1570} + (273.2+t)(p_0/p)^{0.2884} - 273.2$. *Subject Headings:* **Slide rules, Equipotential temperature, Upper air humidity.**

2D–111 551.501.6:551.547.2

Sieger, F., **Eine bequeme Methode zur genauen Bestimmung der Hauptniveauflächen.** [A convenient method for the exact determination of the main level surfaces.] *Germany, Reichsamt für Wetterdienst, Erfahrungsberichte*, 8,(27):197–199, **1934.** 7 figs. **DLC**—A series of diagrams (abscissa, virtual temperature; ordinate, pressure; sloping lines for pressure differences between geopotential and geometric height for the individual stages) for 500, 1000, 2000 . . . 5000 m. enable the pressure at the main height stages to be obtained graphically from the heights of the isobaric surfaces. *Subject Headings:* **Aerological diagrams, Upper air pressure.**

2D–112 551.501.6:551.571'

Tichy, Oleg, **Eine graphische Methode der Luftfeuchtigkeitsbestimmung.** [A graphical method of determining the humidity of the air.] *Zeitschrift für angewandte Meteorologie*, 51:13–19, **1934.** 3 figs. **DWB**—Includes a nomogram connecting absolute humidity (mm.), R.H., dry and wet bulb temperatures. An auxiliary nomogram gives the correction of absolute humidity for pressure. *Subject Headings:* **Hygrometry, Nomograms.**

1935

2D–113 551.501.4:551.571

Bilham, E. G., **A slide-rule for hygrometric calculations.** *Meteorological Magazine*, London, 70:254–258, **1935.** 2 figs. **MH-BH. A humidity slide-rule.** *Journal of Scientific Instruments*, 12:318–322, 1935. **DLC**—Describes and illustrates the "Bilham humidity slide-rule." The upper part of the stock is graduated for relative humidity and the lower part for vapor pressure, wet bulb and dew point. The cursor is graduated for dry bulb and depression of wet, on the front for a psychrometer in the screen, on the reverse for still air and aspirated thermometers. Special small scales give moisture content (gm./m.^{3}) and for wet bulb below 32°F. *Subject Headings:* **Hygrometry, Slide rules.**

2D–114 551.501.6:551.586

Gradstein, S., **Nomogramme für die Abkühlungs- und Austrocknungsgrösse.** [Nomograms for cooling and drying power.] *Meteorologische Zeitschrift*, 52:340–342, **1935.** 3 figs., 2 tables. **MH-BH**—Describes the construction and use of a nomogram based on dry cooling rate $A_t = (0.22+0.25v^{\frac{1}{2}})(36.5-t)$ and saturated cooling rate $(0.22+0.25v^{\frac{1}{2}})(123.7-2.038e-t)$. The parallel scales give e (mg./l.), v (m./sec.), t°C. and S (drying power in mm. per 24 hours) according to Knoche's formula. *Subject Headings:* **Cooling power, Drying power, Nomograms.**

2D–115 551.501.6:551.571

Gray, Leslie, **A useful hygrometric calculating device.** *Monthly Weather Review*, 63:16–17, **1935.** fig. **DWB**—Describes and illustrates a scale graduated for temperature, dew point and vapor pressure which fits across a family of isopleths of relative humidity. Based on *U. S. Weather Bureau Publication*, No. 235, **Psychrometric tables** by C. F. Marvin. *Subject Heading:* **Hygrometry.**

2D–116 551.501.6:551.576.5

Hänsch, F., **Nomogramm zum Wolkenspiegel.** [Nomogram for mirror nephoscope.] *Germany, Reichsamt für Wetterdienst, Erfahrungsberichte,* 9(17):109–113, Feb. **1935.** fig. **DWB**—Nomogram connects time for cloud to traverse a given distance, cloud height in meters and velocity m./sec. *Subject Headings:* **Cloud movement, Nomograms.**

2D–117 551.501.7:551.511

Harrison, Louis P., **Mathematical theory of the graphical evaluation of meteorograph soundings by means of the Stüve (Lindenberg) adiabatic chart.** *Monthly Weather Review,* 63:123–135, **1935.** 5 figs., 2 plates, table, 10 refs., 27 + equations. **DWB**—A full discussion of the basis of the adiabatic chart and its applications, with examples. *Subject Headings:* **Adiabatics, Aerological diagrams, Stüve diagram.**

2D–118 551.501.4:551.511

Millar, F. G., **Rapid methods of calculating the Rossby diagram.** *American Meteorological Society, Bulletin,* 16:229–233, **1935.** 2 figs., 8 tables. **MH-BH**—Describes construction of a slide rule and nomogram for w (mixing ratio) and θ (potential temperature of dry air) $= T(1000/p_d)^{0.288}$, given pressure, relative humidity and temperature. The tables give the necessary numerical values for graduating slide rule or laying out nomogram. *Subject Headings:* **Aerological diagrams, Nomograms, Rossby diagram, Slide rules.**

2D–119 551.501.6:551.501.7

Refsdal, Anfinn, **Das Aerogramm, ein neues Diagrammpapier für aerologische Berechnungen.** [The aerogram, a new diagram paper for aerological calculations.] *Meteorologische Zeitschrift,* 52:1–5, **1935.** 6 figs. **MH-BH**—A general description of the uses and advantages of a new form of aerological diagram. *Subject Headings:* **Aerograms, Aerological diagrams.**

1936

2D–120 551.501.6:551.571

Baker, John R., **Nomograms for saturation deficiency.** *Journal of Animal Ecology,* 5(1):94–96, May **1936.** 2 photos. **DA**—In the 1935 form a cursor graduated in relative humidity crosses a temperature scale and a family of curves to give absolute humidity or saturation deficit. In a second type the lower scale is graduated for dry bulb and the cursor for depression of wet, based on Glaisher's and Marriott's psychrometric tables for still air. *Subject Headings*: **Hygrometry, Nomograms.**

2D–121 551.501.6:551.547.1

Marczell, György, **Grafikus tâblâk a hipszometrikus formula kiertékelésére.** [Graphical tables for evaluating hypsometric formula.] *Idöjárás,* 40:222–227, **1936.** German summary p. 260–262, plate. **MH-BH**—A nomogram is reproduced for evaluating geopotential $\Phi = -RT_v \log(p_1/p)$ where T_v is virtual temperature. A second nomogram gives humidity correction for virtual temperature. *Subject Headings:* **Geopotential, Nomograms.**

1937

2D–122 551.501.6/7:551.511

Martinozzi, Leonardo, **I diagrammi termodinamica in meteorologia.** [Thermodynamical diagrams in meteorology.] *Rivista di Meteorologia Aeronautica,* 1:10–30, July **1937.** 6 figs., 9 refs. **DWB**—An important systematic account with illustrations of Shaw's tephigram, the emagram, Refsdal's aerogram, Schinze's thetagram, Robitzsch's diagram, evogram and Rossby's diagram, considering isobars, adiabatics, pseudoadiabatics, isopleths of max. vapor content and specific volume, and isotherms. Ends with some suggestions for coding. *Subject Headings:* **Aerograms, Aerological diagrams, Evograms, Rossby diagram, Thetagrams.**

2D–123 551.501.6/7:551.511

Refsdal, Anfinn, **Aerologische Diagrammpapiere.** [Aerological diagram-papers.] *Geofysiske Publikasjoner,* 11(13), **1937.** 55 p. 29 figs., plate, 31 refs. **DWB, DLC**—This fundamental paper discusses a number of types of grams to find the most rapid and comprehensive aerological working sheet possible. It opens with the application of the pressure-volume diagram to considerations of circulation (solenoid calculations, V. Bjerknes) or energy (Margules, Shaw). Equal area transformations are next considered, then graphical height calculations. Various additions lead to the aerogram, which replaces the tables of V. Bjerknes for height calculations. The various graphical processes are explained, including calculation of equivalent temperature, pseudo-temperatures, entropy, change of temperature by vertical movement of air masses. Also discussed: thetagram paper (Moese and Schinze, equivalent potential temperature against height), log p–log T diagram

and Rossby's air mass paper. In Pt. II examples are given of the application of diagram papers to purely theoretical problems—solenoid and pressure field, corresponding pressure changes at different levels, and available kinetic energy. The paper ends with a discussion on "mean temperature." *Subject Headings:* **Aerograms, Aerological diagrams, Rossby diagram, Thetagrams.**

1938

2D–124 551.501.6:551.571

Albright, John Grover, **Psychrometric charts.** *Monthly Weather Review*, 66:178–181, **1938.** 2 figs. **DWB**—Chart 1 gives on rectangular axes of dry bulb and depression of wet, °F., curved isopleths of R.H. and absolute humidity in grains/cu.ft. Chart 2 gives the same in metric units. *Subject Heading:* **Hygrometry.**

2D–125 551.501.6/7:551.511

Arakawa, H., **Höhenberechnungen und energetische Betrachtungen mittels Emagramm.** [Height calculations and energy considerations by the emagram.] *Meteorological Society of Japan, Journal, 2nd Ser.*, 16:47–50, **1938.** fold. plate. In Japanese, English summary p. (5). **DWB.** *Beiträge zur Geophysik*, 51:321–324, 1937. **DWB**—Simple rapid methods of graphical calculations of heights and energy by Refsdal's emagram are described. *Subject Headings:* **Aerological diagrams, Emagrams.**

2D–126 551.501.6:551.547

Barberon, J., **Abaque pour la formule de Laplace simplifiée.** [Calculating diagram for the simplified formula of Laplace.] *Annales de Physique du Globe de la France d'Oûtre-mer*, 5(27):65–67, 73–80, June **1938.** fold. diagram. **DLC**—The large double-sided diagram is based on $z = 18400(\log p_u - \log p_v)(1 + \theta/273)$ where p_u, p_v are upper and lower pressures. An inset diagram gives virtual mean temperature θ corrected for variation of gravity. *Subject Heading:* **Barometer reduction.**

2D–127 551.501.6:551.571

Bilancini, R., **Un grafico per il calcolo del punto de rugiada.** [A graph for calculating the dew point.] *Rivista di Meteorologia Aeronautica*, 2(4):1–3, **1938.** fig. **DWB**—Diagram gives coordinates of air temperature and dew point with sloping isopleths of R.H. *Subject Heading:* **Dew point.**

2D–128 551.501.7:551.547.1

Bilham, E. G., **A height-computer for use in aerological work.** *Great Britain, Meteorological Office, Professional Notes*, 5(80), **1938.** 13 p. 3 figs., plate, table. At head of title M.O.336t. **MH-BH**—In an instrument constructed in 1922 a hinged arm graduated in 1000's of feet slides along an upright arc graduated in °F. The base scale is graduated in mb. and carries a cursor by which the height for any temperature and pressure can be read. A revised form is described. *Subject Headings:* **Barometer reduction, Height computers.**

2D–129 551.501.6:551.558

Fea, G., **Mezzi grafici e meccanici atti ad accelerare il calcolo relativo a funzioni importanti per lo studio dei fenomeni meteorologici.** [Graphical and mechanical methods for speeding up calculations of functions important for the study of meteorological phenomena.] *Rivista di Meteorologia Aeronautica*, 2(2):21–30, **1938.** 10 figs., table. **DWB**—Describes diagrams for evaluating vertical currents (height or temperature against temperature difference between neighboring air masses). Cumulus clouds and mountain winds are considered. *Subject Heading:* **Vertical currents.**

2D–130 551.501.6/7:551.511

†International Meteorological Organisation, Aerological Commission, **Über aerologische Diagrammpapiere. Denkschrift des Präsidenten L. Weickmann.** [On aerological diagram papers. Memoir by the President L. Weickmann.] Berlin, Julius Springer, **1938.** 123 p. 27 figs., 41 plates, biblio. p. 117–123. **DWB**—This invaluable summary includes a description and specimen of all types of working diagrams of atmospheric states. The text describes the p.v. diagram and its transformations, a number of historical types not now much used (adiabatic diagrams of Hertz, Neuhoff, Kreitmeyer), height calculator of Bjerknes, Fjeldstad adiabat table, Diesing, Refsdal's evogram. Pt. C covers the Stüve adiabat paper and its derivations—Stüve's $T - \log p$ diagram, Refsdal's and the Japanese emagram, Stüve's $T - p^k$ diagram, issued in various countries and Schüepp's transformed thermodynamic Stüve diagram. Pt. D covers the Shaw tephigram and its variants in Canada, India, Japan and U. S. A. Pt. E, air mass paper, includes Rossby's equivalent potential temperature diagram and its transposition in the Clark diagram, Schinze's thetagram paper. Pt. F, aerological paper for great heights, includes the log p, log T and Robitzsch diagrams, the aerograms of Refsdal, Väisälä and Arakawa and Werenskiold's diagram. The applications of

diagram paper in different countries are compared and fundamental questions discussed. An appendix gives examples of the use of G. Schinze's thetagram paper. The exhaustive bibliography is of great value. *Subject Headings:* **Aerological diagrams, Aerograms, Evograms, Tephigrams, Thetagrams, Bibliographies.**

2D–131 551.501.6:551.515.8

Kolokolova, G. V., **Primenenie analiza rossbigramm v sluzhbe pogody.** [Rossby-gram readings in the meteorological service.] *Meteorologiia i Gidrologiia*, No. 2:39–51, 1938. 21 figs. **DWB**—A statement with examples of the advantages of the Rossby-gram in identifying air masses and determining their stability by the negligible variation of specific humidity with height and the rapid increase of potential and equivalent potential temperature. Ends with a comparison with Refsdal's emagram. *Subject Headings:* **Emagrams, Rossby diagram.**

2D–132 551.501.6/7:551.511

Schüepp, M., **Eine Transformation des Stüveschen Adiabatenpapiers zur graphischen Bestimmung der äquipotentiellen Temperaturen.** [A transformation of the Stüve adiabat-paper for graphical determination of equipotential temperature.] *Beiträge zur Physik der freien Atmosphäre*, 24:238–242, 1938. 4 figs. **DLC**—At Dübendorf, Switzerland, the Stüve diagram has been modified to make the abscissa the saturated adiabatic instead of air temperature. The ordinate remains as pressure. The scales are arbitrarily chosen to make the curved temperature isopleths equidistant along the 1000 mb. line. On the back, on the same scale, are curves of equal specific humidity gm./kg. and dry adiabatics. The paper is translucent and can be used on a tracing table. The trace of an ascent is nearly vertical, and the pressure—R.H. curve gives a clear indication of the equipotential temperature. Instructions for use given. *Subject Headings:* **Aerological diagrams, Stüve diagram.**

2D–133 551.501.6/7:551.511

Werenskiold, W., **On equal-area transformations of the indicator diagram, and a new aerological chart.** *Geofysiske Publikasjoner*, 12(6), 1938. 10 p. 7 figs., plate. **DLC**—Author constructs a chart for adiabats, stability and energy relations in dry air. Horizontal straight lines represent pressure, verticals entropy and sloping lines dry bulb; lines of crosses represent areas for determination of dynamic height. *Subject Heading:* **Aerological diagrams.**

1939

2D–134 551.501.7:551.547.1

Arakawa, H., **An improved height-computer.** *Meteorological Society of Japan, Journal, 2nd Ser.*, 17:415–416, 1939. 2 figs. In Japanese, English summary p. (41)–(42). **DWB**—Describes and illustrates a slide rule for determining heights from a series of observations of pressure and temperature in the upper air. *Subject Headings:* **Height computers, Slide rules.**

2D–135 551.501.6/7:551.511

Arakawa, H., **Das θp-Diagramm (Piphigramm), ein neues Diagrammpapier.** [The θp-diagram (piphigram), a new diagram paper.] *Meteorological Society of Japan, Journal, 2nd Ser.*, 17:331–332, 1939. 3 figs. **DWB**—The abscissa is a linear temperature scale, the pressure scale is $(p/P)^{AR/c}p$. This is an equal area transformation of the tephigram. *Subject Headings:* **Piphigrams, Tephigrams.**

2D–136 551.501.6:551.571

Bleeker, W., **A diagram for obtaining in a simple manner different humidity elements and its use in daily synoptic work.** *American Meteorological Society, Bulletin*, 20(8):325–329, Oct. 1939. fig. **MH-BH**—The "Bleeker humidity diagram" resembles a nomogram, showing vertical scales of mb. pressure and mixing ratio, sloping parallel scale of temperature °C., curve scales of relative humidity and absolute humidity in gm./m.^{3}. A number of applications are described. *Subject Headings:* **Bleeker humidity diagram, Hygrometry, Nomograms.**

2D–137 551.501.4:551.571

Fea, G., **Rigolo per il calcolo delle umidità specifiche, e delle temperature potenziale, equivalente, equivalente potenziale e dell'entropia.** [Rules for the calculation of specific humidity, and of potential, equivalent, equivalent potential temperature and of entropy.] *Rivista di Meteorologia Aeronautica*, 3(2):29–36, 1939. 4 figs. **MH-BH**—Includes a nomogram with a number of parallel scales, constants and formulas on which it is based and instructions for construction and use for working up radiosonde ascents. *Subject Headings:* **Entropy, Hygrometry, Nomograms, Potential temperature.**

2D–138 551.501.6/7:551.547.1

Harff, ——, **Quelques procédés simplifiés des calculs aérologiques.** [Some simplified procedures for aerological calculations.] *La Météorologie*, 3rd Ser., p. 124–127, **1939.** 2 figs., fold. table. **DWB**—Table is for calculating heights by the relation $\Delta z = cT_m \log p_0/p$. An "abacus" is illustrated with coordinates of temperature and height (geometric or geodynamic meters) and a network of height differences, isobars and specific volumes, which can be used for a variety of calculations. *Subject Heading:* **Height computers.**

2D–139 551.501.6/7:551.511

Morasca, N., **Grafici per il calcolo rapido della temperature equivalente potenziale.** [Diagrams for rapid calculation of equivalent potential temperature.] *Rivista di Meteorologia Aeronautica*, 3(4):22–24, **1939.** 11 figs. **MH-BH**—Gives diagrams for calculating equivalent potential temperature from pressure and temperature: one each for R. H. 0, 10 . . . 100%. Based on:

$$\theta' = \left(T + \frac{1570e}{p}\right)\left(\frac{1000}{p}\right)^{0.288} - 273.$$

Subject Heading: **Potential temperature.**

2D–140 551.501.6/7

Robitzsch, Max, **Adiabatenblätter.** [Adiabat sheets.] *Zeitschrift für angewandte Meteorologie*, 56(2–3):37–44, 69–78, **1939.** 7 figs. **DWB**—A general account of the principles of adiabatic diagrams and calculations which can be made with them. *Subject Heading:* **Aerological diagrams.**

2D–141 551.501:551.521

Terada, K., **Tables and graphs of the black body radiation for meteorological use.** *Geophysical Magazine, Tokyo*, 13(2):137–143, Dec. **1939.** 3 figs., 3 tables. **MH-BH**—Gives tables and nomograms for calculating wave length λ_m at which maximum energy occurs ($\lambda_m T = 2918.4$ micron), max. intensity $E_m = 1.78042 \times 10^{-14} T^5$ gcal./cm.²/min. and total radiation of a perfect radiator $E = 7.9018 \times 10^{-11} T^4$ gcal./cm.²/min. *Subject Headings:* **Radiation, Nomograms.**

2D–142 551.501.6:551.571

Uttinger, H., **Graphische Aspirations-Psychrometer-Tafeln zur Bestimmung der relativen Feuchtigkeit unter verschiedenem Luftdruck.** [Graphical aspiration psychrometer tables for determining relative humidity under different pressure.] *Meteorologische Zeitschrift*, 56(10):390–392, Oct. **1939.** 2 figs. **MH-BH**—The first diagram has dry bulb and R.H. as axes and curves of wet bulb (°C.) for pressure of 755 mm. The second gives correction to R.H. against dry bulb for pressures of 700, 650 . . . 500 mm. and instructions for interpolation. *Subject Heading:* **Hygrometry.**

1940

2D–143 551.501.6/7

Amble, Ole, **The tropogram, a new aerological diagram.** *Archiv för Mathematik og Naturvidenskab*, 44(2), **1940.** 24 p. 6 figs., fold. plate, 18 equations. **DLC.** Review in *Meteorologische Zeitschrift*, 58:189, 1941. **MH-BH**—After an introduction on aerological diagrams in general and those in general use, author sets out the desiderata—determination of stability, calculation of geopotential, representation of conservative properties of air masses. He describes a new diagram for aerology of troposphere. The base is 1050 mb., isobars are nearly horizontal, isotherms oblique lines ascending to the right, saturation adiabats nearly vertical, etc. Average conditions in an ascent are represented by a vertical line. *Subject Headings:* **Aerological diagrams, Tropograms.**

2D–144 551.501.6:551.542.1

Brown, C. V., **A design for a geostrophic wind scale.** *American Meteorological Society, Bulletin*, 21(5):178–181, May **1940.** fig., 2 tables. **DWB**—The scale takes the form of curves on a rectilinear diagram showing 6 hour resultant wind and Beaufort force for latitude and distance apart of 2 mb. isobars. *Subject Heading:* **Geostrophic winds.**

2D–145 551.501.6:551.509.53

Jacobs, Woodrow Cooper, **A convenient minimum temperature diagram.** *American Meteorological Society, Bulletin*, 21(7):297–301, Sept. **1940.** fig., 4 tables, refs. **DWB**—Diagram shows curves of dew point against anticipated fall of temperature from sunset and hours after sunset as rectangular coordinates. Tables show the data and correcting factors. Data based on Brunt's equation. *Subject Headings:* **Dew point, Minimum temperatures.**

2D–146 551.521.3

Kennedy, Robert E., **Average daily air mass.** *Monthly Weather Review*, 68(11):301–303, **1940.** fig. **DWB**—Gives a diagram for finding average daily air mass (including allowance for refraction) for any latitude and any declination. *Subject Heading:* **Air mass.**

1941

2D–147 551.501.7:551.547.3:681.44

Fulks, Joe Robert, **Construction and use of a slide rule for determining 10,000 foot pressure.** *American Meteorological Society, Bulletin*, 22(1):21–24, Jan. **1941.** fig., 3 tables. **DWB.** Fulks, Joe Robert and Dightman, R. A., **A slide rule for determining 10,000 ft. pressure.** *Monthly Weather Review*, 69:71–73, **1941.** fig. **DWB**—The slide rule includes 3 scales, $A = 100 \log P_0 - 300$, $B = 100 \log P - 277$ and $C = 23 - 100/(.022126 T_m)$, T_m = virtual temperature. *Subject Headings:* **Slide rules, Upper air pressure.**

2D–148 551.501.6:551.509.317

Wadati, K. and Matuo, K., **A new thermodynamic diagram for practical use.** *Meteorological Society of Japan, Journal, 2nd Ser.*, 19(4):138–141, April **1941.** 3 figs. In Japanese, English summary p. (13)–(14). **DWB**—Abscissa is equivalent potential temperature, ordinate barometric pressure. Lines are given for temperature, mixing ratio, dry adiabatic and height. Convenient for forecasting, as an ascent is represented by a nearly vertical line. *Subject Heading:* **Aerological diagrams.**

1942

2D–149 551.501.6:551.571

Beardsley, Kenneth D., **Nomographic charts for vapour pressure.** *General Electric Review*, New York, 45:281–283, May **1942.** 2 figs. Summary in *Science Abstracts*, 2954, Nov. 1942. **DWB**—The first nomogram gives vapor pressure (inch Hg. at pressure of 29 in.) in terms of wet and dry bulb °F. The second is a correction nomogram for different barometric pressures. *Subject Headings:* **Hygrometry, Nomograms.**

2D–150 551.501.4/6:551.586

Corlette, Cyril Ernest, **On the heat-absorbing or heat-lifting capacity of wind in relation to the human body, with a table for calculating it.** Gibson, W. H. H., **Note on a diagram for the calculation of the heat-absorbing capacity of a cubic metre of air, based on the tables of Dr. C. E. Corlette.** Corlette, C. E., **Measurement of the drying capacity of wind. On the calculation of the heat and moisture dissipated from the body by respiration, with a table designed to make calculation easy at any temperature, any humidity and any pressure of the air.** Reprinted from: *Medical Journal of Australia*, April 18, May 23 and Sept. 5, **1942.** 20 p. figs. tables. **GB-MO**—Corlette discusses physiology of heat dispersal and temperature regulation and gives a table of heat required to raise to 33°C. and saturate a cubic meter of air for air temperature −60 to +55°C. He then introduces the effect of wind velocity. Gibson designed a nomogram connecting air temperature and relative humidity with heat absorbing capacity. *Subject Headings:* **Bioclimatology, Cooling power, Drying power, Nomograms.**

2D–151 551.501.7:551.576.4

Dwight, Charles Harrison, **Graphical determination of the height of the convective cloud base.** *American Meteorological Society, Bulletin*, 23:(2)78–79, Feb. **1942.** fig. **DWB**—A simple square diagram representing $H(\text{ft.}) = 1000(t_1 - t_2)/4.5$, where t_1, t_2 are ground values of temperature and dew point. *Subject Heading:* **Cloud height.**

2D–152 551.501.7:551.547.1

Lugeon, Jean, **Höhenintegrator.** [Height integrator.] *Meteorologische Zeitschrift*, 59(1):12–19, Jan. **1942.** 6 figs., tables. **MH-BH**—The rolling integrator (described and illustrated) takes account of pressure, temperature, humidity and gravity and works on a plot of virtual temperature and log (pressure). Instructions for use and a correction table from dynamic to geometric meters are given. *Subjects Headings:* **Barometer reduction, Height computers.**

2D–153 551.501.6:551.571

Morasca, N., **Grafici psicrometrici.** [Psychrometric diagrams.] *Rivista di Meteorologia Aeronautica*, 6(2):61–65, April **1942.** 4 figs. **MH-BH**—Gives diagrams with dry and wet bulb as axes, and a family of isopleths of R.H., and also for wet bulb frozen, for heights of 0–600 and 600–1800 meters above M.S.L. *Subject Heading:* **Hygrometry.**

2D–154 551.501.4:551.577.37

Showalter, A. K. and Solot, S. B., **Computation of maximum possible precipitation.** *American Geophysical Union, Transactions*, **1942.** p. 258–274. 16 figs. **MH-BH**—Includes a "density chart" with coordinates pressure (mb.) and temperature (°F.), and sloping density lines. This gives the critical angle for $\frac{\partial}{\partial z}\left(\frac{\partial p}{\partial h}\right)$ exceeding 0, and also a number of duration time curves in relation to other meteorological elements. *Subject Heading:* **Maximum precipitation.**

1943

2D–155 551.547:681.14

Bellamy, John Carey, **A pressure-height slide rule.** Chicago, University of Chicago Press, **1943. DWB**—Describes a circular slide rule connecting pressure and height. *Subject Headings:* **Barometer reductions, Slide rules.**

2D–156 551.501:551.547.1

Fletcher, R. D. and Graham, R. D., **A pressure-height nomogram for use by the practical forecaster.** *American Meteorological Society, Bulletin*, 24:282–284, Sept. **1943.** plate. **DWB**—The nomogram on a folding plate solves the equation $\log_e p_z - \log_e p_0 = \frac{-1}{R.T_m}(z - z_0)$ if any 3 of variables p, p_0, T'_m (mean virtual temperature of layer) or $z - z_0 (gdm)$ are known. Horizontal scales for $z - z_0$ and p_z, families of sloping lines for p_0 and $T'_m(°A.)$. *Subject Headings:* **Barometer reduction, Nomograms.**

2D–157 551.501.6/7:551.511

Gómez, José C., **Aerograma de Refsdal.** [Refsdal's aerogram.] *American Meteorological Society, Bulletin*, 24(1):7–10, Jan. **1943.** 2 figs. **DWB**—A description and illustration of Refsdal's aerogram containing lines of max. specific humidity, dry and saturated adiabatics and a vertical scale for dynamic height (used as a nomogram). *Subject Headings:* **Aerograms, Nomograms.**

1944

2D–158 551.501.6:551.571

Berl, E. and Sterbutzel, G. A., **Nomographs for the solution of psychrometric problems.** *Monthly Weather Review*, 72:135–137, **1944.** 2 figs. **MH-BH**—Gives two complicated-looking nomograms (one each in metric and British units) relating dew point, R.H., heat content (enthalpy), vapor pressure and mixing ratio. *Subject Headings:* **Enthalpy, Hygrometry, Nomograms.**

2D–159 551.501.6:551.511

Bessemoulin, J., **Considérations générales sur les diagrammes aérologiques.** [General considerations on aerological diagrams.] *La Météorologie*, 3rd Ser., p. 16–37, **1944.** 6 figs., numerous equations. **DWB**—Diagrams are classified as "equivalent" or "non-equivalent" to Clapeyron's, the first having great advantages. Various diagrams for representing the state of a fluid are discussed and the principles of construction of aerological diagrams analyzed. The different scales of ordinates are examined—p, log p; T, log T—other systems include T, $p^{(r-1)/r}$ (Stüve, Robitzsch); $p^{(r-1)/r}$, potential temperature θ (Werenskiold). Non-equivalent diagrams include log p, log T (Hertz); z, T; θ, log p (Schinze's thetagram); entropy, $p^{(r-1)/r}$ (Schüepp); θ, specific humidity (Rossby); T log p, log T (Refsdal). The advantages of each are discussed. The diagrams T, log p and Refsdal's aerogram are preferred. *Subject Headings:* **Aerological diagrams, Aerograms.**

2D–160 551.501.7:551.542.1

Franssila, Matti, **Eine graphische Methode zur Bestimmung des geostrophischen Windes.** [A graphical method of determining the geostrophic wind.] *Finland, Ilmatieteelisen keskuslaitoksen, Toimituksia*, 24, **1944.** 22 p. 4 figs., tables. **MH-BH**—Given upper air ascents at three points on a triangle, a method is described of finding the gradient wind v, using the relation $2\omega \sin \phi v + v^2/r = g \tan \alpha$ where r is the radius of curvature and α angle is inclination of the isobaric surface. Agreement between observed and geostrophic wind is briefly discussed. *Subject Heading:* **Geostrophic winds.**

2D–161 551.501.6

Germany. Reichsamt für Wetterdienst, **Nomogramme des R. F. W.** [Nomograms of the R. F. W.] Teil A, **1944. DLC, DWB**—

Includes: No. 14 a. Lunz, P., **Diagramm zur Bestimmung der nächtlichen Temperaturabnahme nach Lambert-Schumacher.** [Diagram for determining the nocturnal temperature decrease after Lambert-Schumacher.] 2 p. plate. Temperature decrease in any given number of hours after sunset from that in 2 hours after sunset.

No. 14 b. Lunz, P., **Petterssens Nebelvorhersage-Diagramm.** [Petterssen's fog-forecasting diagram.] 2 p. 2 plates.

[No. 15]. Philipps, H., **Gradientwind-Nomogramm zur Berechnung des zyklostrophischen und geostrophischen Windes.** [Gradient wind nomogram for calculating the cyclostrophic and geostrophic wind.] 3 p. plate.

No. 16. Dinkelacker, O., **Nomogramm zur Bestimmung der unteren Wolkengrenze in aufsteigender Luft.** [Nomogram for determining the cloud base in rising air.] 2 p. plate. From dry and wet bulb temperatures and relative humidity.

No. 17. Dinkelacker, O., **Nomogramm zur Ermittlung der mittleren Geschwindigkeit in Höhenschichten.** [Nomogram for evaluating the mean velocity in height intervals.] 2 p. plate. From speed of ascent of pilot balloons, using a p. b. slide rule.

With these may be included:

Anweisung zum Gebrauch der Luftdichtennomogramme. [Instructions in the use of the air density nomogram.] s.a. 2 p. plate.

Die Abweichungen der internationalen Höhenskala von den wahren Höhen als Funktion der Höhentemperatur und des mittleren Temperaturgradienten in der Gesamtluftschicht ausgedrückt. [The departures of the international height scale from the true height expressed as a function of temperature at the height and the mean temperature gradient in the whole layer of air.] s.a. 3 p. 2 plates.

Gebrauchsanleitung zum Nomogramm zur Ermittlung des Wolkenzuges, der Wolkenhöhe, der wahren und relativen Winkelgeschwindigkeiten der Wolken nach Klemm. [Instructions in the use of the nomogram for evaluating cloud velocity, cloud height, true and relative angular velocity of clouds after Klemm.] s.a. 3 p. plate. *Subject Headings:* **Nomograms, Air density, Fog forecasting, Gradient winds, Cloud height, Cloud velocity.**

2D–162 551.501.6:551.521.3

Möller, F., **Grundlagen eines Diagramms zur Berechnung langwelliger Strahlungsströme.** [Basis of a diagram for calculating long-wave radiation.] *Meteorologische Zeitschrift*, 61(2):37–45, Feb. **1944.** 5 figs., 5 tables, 13 refs. **MH-BH**—Author discusses absorption functions of a spectral line, water vapor spectrum, dependence of water vapor absorption coefficient on wave length, pressure and temperature, radiation and absorption by CO_2 and its dependence on pressure. He describes a radiation diagram for the numerical evaluation of long wave radiation penetrating the atmosphere vertically. Diagram printed by Reichsamt für Wetterdienst. *Subject Heading:* **Radiation.**

2D–163 551.501.6/7:551.511

Schüepp, M., **Das Emagramm 1944 der Schweiz.** [The Emagram, 1944, in Switzerland.] *Schweizerische Meteorologische Zentralanstalt, Annalen*, 81, Anhang: 1–3, **1944.** plates. **DWB**—Refsdal's emagram on rectilinear orthogonal coordinates log p and T gives an exact representation of energy. It has been completed by adding curves representing humidity and giving a simple representation of the equipotential temperature. An example is given and also a scale on transparent paper, to be superposed on the emagram, for evaluating specific humidity, height in gdm. and equipotential temperature. *Subject Headings:* **Aerological diagrams, Emagrams.**

1945

2D–164 551.501.6:551.55

Auberger, L., **Utilisation des méthodes graphiques en météorologie.** [Utilization of graphical methods in meteorology.] *La Météorologie*, 3rd Ser., No. 55–56–57:55–63, Jan.–June **1945.** 8 figs., plate. **DWB**—Describes graphical methods for wind calculations used on the Carimaré. The upper part of the graph is for calculating the horizontal distance of a balloon as a function of altitude. The lower part gives horizontal distance in terms of azimuth, for plotting the horizontal projection of the track of the balloon. Other figures illustrate a special rose for plotting pilot balloon tracks with a known rate of ascent, scales for altitude and wind speed from radiosondes, and a method of calculating errors graphically. *Subject Heading:* **Upper wind computation.**

1946

2D–165 551.501.7

Arakawa, H., **Height-computer, humidity computer and potential-temperature-computer.** *Geophysical Magazine, Tokyo*, 14(1):35–39, March **1946.** 3 figs. **MH-BH**—Describes and illustrates a slide rule for determining heights by relation $h = 18400 \log_{10}(p_0/p)(1+t_m/273)$ and potential temperature by $\theta = T(P/p)^{0.2884}$, and another for vapor pressure, dew point and mixing ratio from upper air observations of p, t and R.H. *Subject Headings:* **Height computers, Hygrometry, Slide rules.**

2D–166 551.501.7:551.511

Dentone, Américo, **Tefigrama.** [Tephigrams.] *Revista Meteorológica*, 5(19):163–179, **1946.** 9 figs. **DLC, DWB**—An account with illustrations of the calculation of entropy from Shaw's tephigram. The mathematical basis is set out. *Subject Headings:* **Entropy, Tephigrams.**

2D–167 551.501.6:551.571

Finniecome, J. R., **Characteristic data on the mixture of air and water vapor for atmospheric conditions.** *Mechanical World Monographs* (32). Manchester, Emmott, **1946.** 31 p. 19 figs., 2 tables, 29 equations. **GB-MO**—Includes a number of diagrams: Glaisher factor, pressure of saturated steam, relative humidity from dry- and wet-bulb, quantity of water vapor in air, gas constant, specific weight and total heat in mixtures of air and water vapor, psychrometric chart and H-q diagrams. Mainly for engineers. *Subject Headings:* **Engineering, Hygrometry.**

2D–168 551.571 551.511

Goff, John A. and Gratch, S., **Low-pressure properties of water from −160 to 212°F.** *American Society of Heating and Ventilating Engineers, Transactions*, 52, **1946.** In *Heating, Piping and Air Conditioning*, [1946]:95–121. fig., 7 tables. **DLC**—Gives various properties of water vapor. The important tables are thermodynamic properties of water at saturation: solid vapor and liquid vapor, in engineering units (lb./sq.in., in.Hg. etc.) including pressure, specific volume, enthalpy and entropy. Adopted by International Meteorological Organisation, Washington 1947, as standard for meteorology. *Subject Heading:* **Hygrometry.**

2D–169 551.501.6:551.509.53

Lönnqvist, Olov, **A frost prediction diagram.** *Arkiv för Matematik, Astronomi och Fysik*, 32A(13), **1946.** 7 p. 6 figs., table. **MH-BH**—Gives diagrams for reading off expected drop in temperature during the night for various combinations of length of night, state of ground, temperature, vapor pressure, cloud heights, sky cover. *Subject Heading:* **Frost prediction.**

1947

2D–170 551.501.6/7:551.511

Herlofson, N., **The T, log p-diagram with skew co-ordinate axes.** *Meteorologiske Annaler*, 2(10):311–342, **1947.** 3 figs., 4 plates, tables. **DWB, DLC**—Describes a new aerogram designed for very accurate determination of heights of standard pressure surfaces, convenient determination of heights of significant points and of static stability and thermodynamic relations. The general lay out is similar to the tephigram, but with the dry adiabats straight and the isobars slightly curved. Auxiliary graphs convert R.H. and dry-bulb temperature into virtual temperature, and wet bulb, depression of wet- and dry-bulb to virtual temperature. The method of construction is fully described with useful tables of numerical values. *Subject Heading:* **Aerological diagrams.**

2D–171 551.501.6:551.515

Hosino, T., **Nomogram for computing the height of cyclone (or anticyclone).** *Meteorological Society of Japan, Journal, 2nd Ser.*, 25:141–145, **1947.** 4 figs. In Japanese, English summary p. (21). **MH-BH**—The nomogram is based on pressure and temperature at the ground and the pressure and temperature difference between inner and outer part of cyclone or anticyclone. The height is defined as where the pressure difference vanishes. The temperature lapse rates are assumed equal. *Subject Headings:* **Anticyclones, Cyclones, Nomograms.**

2D–172 551.501.7:551.507.321.4

Malurkar, S. L., **A simple nomogram for the rate of ascent of rubber balloons and improved technique with balloons and balloon material.** *Indian Academy of Science, Proceedings*, 25A:307–313, **1947.** **DWB**—Using formula $R = kL^{\frac{1}{3}}/(L+W)^{\frac{1}{3}}$ where R = rate of ascent, L = lift and W = weight of balloon, author describes how a nomogram can be constructed from transformation to $Y^3 = (Y+X)^2$. Nomogram not illustrated. *Subject Headings:* **Nomograms, Balloons.**

2D–173 551.501.6:551.542.1

Phillipps, H., **Gradientwind-Nomogramm. (Ein Nomogramm zur Bestimmung des zyklostrophischen Windes.)** [Gradient wind nomogram. (A nomogram for determining the cyclostrophic wind.)] *Zeitschrift für Meteorologie*, 1:201–211, **1947.** 4 figs., nomogram, 42 equations. German summary p. 211. **DWB**—The nomogram consists of verticals graduated in distance apart of 4 dyn. dekameter isohypses and radius of curvature (km., anticyclonic or cyclonic). These enclose a network of curved lines of latitude and verticals of wind velocity (km./hr.). Two diagrams are given, for wind speeds up to 100 and up to 500 km./hr. Basis of calculation set out in great detail. *Subject Headings:* **Gradient winds, Nomograms.**

1948

2D–174 551.501.6/7:551.511

†Defrise, Pierre, **Contribution à une étude comparative des diagrammes aérologiques.** [Contribution to a comparative study of aerological diagrams.] *Belgium, Institut Royal Météorologique, Miscellanées*, Fasc. 33, **1948.** 36 p. 13 figs. **MH-BH**—A critical comparison of a number of diagrams from the points of view of calculating thicknesses, sensibility to variations of the thermal gradient, and dimensions. Proposes a modification of Werenskiold's equal area indicator diagram [*see item* 2D–133]. The characteristics and formulas of a large number of diagrams are summed up in a useful table. A bibliography of 8 items extends Weickmann's [1938] to 1947. (*See item* 2D–130.) *Subject Heading*: **Aerological diagrams.**

2D–175 551.501.6:551.557

Great Britain. Meteorological Office, **Notes on the uses of the vector wind diagram (Form 2460).** Form 2460A. London, **1948.** 6 p. 2 figs., plate. Duplicated. **GB-MO**—Form 2460 is a sheet containing 12 circular diagrams graduated in degrees and speeds. 2460A gives instructions for use in constructing hodographs and in calculating thermal winds from vector difference in winds at two heights (shear hodograph). *Subject Headings:* **Vectors, Wind computations, Hodograph.**

2D–176 551.501.4

Hensley, Reece V., **Mollier diagrams for air saturated with water vapor at low temperatures.** *U. S. NACA Technical Note*, No. 1715, Sept. **1948.** 16 p. 2 figs., 3 refs., equations. **DLC**—(*See item* No. I–144 in Sept. 1950 and No. 11–13, Nov. 1950 *Meteorological Abstracts.*) *Subject Headings:* **Nomograms, Mollier diagram, Icing, Aviation.**

2D–177 551.501.7

Pône, R., **Les diagrammes aérologiques en usage à l'Établissement Central de la Météorologie.** [Aerological diagrams in use at the Central Establishment of Meteorology.] *La Météorologie*, 4th Ser., No. 10:111–144, **1948.** 24 figs., 2 plates. **DWB**—A new form of emagram in use at the Établissement Central (ECM Form No. 761) is described and illustrated. The axis for log p is at 45° to horizontal T axis, giving a more open temperature scale and wider angles between curves plotted on the diagram. The use of the diagram for the usual transformations and the plotting of ascents is described, and the reasons for adopting it in place of the former rectangular diagram are set out. Some other T-log p diagrams are briefly mentioned. *Subject Headings:* **Aerological diagrams, Emagrams.**

2D–178 551.501.6

Shimose, T., **On the transformation of adiabatic charts taking account of the height-calculation.** *Meteorological Society of Japan, Journal, 2nd Ser.*, 26, Special Report, p. 33–36, **1948.** In Japanese, English summary p. 87–88. **MH-BH**—From Laplace's fundamental pressure equation and the condition of equal area transformation, author derives a general formula for aerological charts. *Subject Heading:* **Aerological diagrams.**

2D–179 551.501.6:551.571

Stucki, E. and Uttinger, H., **Table psychrométrique "Haenni."** ["Haenni" psychrometric tables.] *Les Nouvelles de Haenni*, Jagenstorf, No. 14, Jan.–Feb. **1948.** 4 p.; No. 15, March–April **1948.** 4 p. 5 figs. **GB-MO**—Describes a handy circular nomogram with sliding arm for calculating relative humidity from readings of dry- and wet-bulb temperature. *Subject Headings:* **Hygrometry, Nomograms.**

2D–180 551.501.6:551.547.1

Thompson, J. C., **A practical graph for computing the height of the 700-milibar surface over the ocean.** *American Meteorological Society, Bulletin*, 29(6):298–302, June **1948.** 3 figs. **DWB**—A rectangular diagram gives height of 700 mb. surface in feet for given sea-level pressure and temperature and assumed lapse rates, assuming a mean relative humidity of 75% for the column. *Subject Heading:* **Upper air pressure.**

2D–181 551.501.6:551.547.2

U. S. Weather Bureau, **Pressure reduction diagram—1000GDM to sea level. s.a. chart. [1948].** Also: **Pressure reduction table for 1000 geodynamic meters. DWB**—Coordinates pressure in mb. at 1000 gdm. and M.S.L. Sloping lines give mean virtual temperature between 1000 gdm. and sea level. A companion chart is **"Mean virtual temperature from 1000 GDM to sea level."** *Subject Heading:* **Barometer reduction.**

2D–182 551.501.6:681.14:016

†Walther, A. and Kron, A.-W., **Nomographie und Rechenschieber.** [Nomography and slide rules.] *FIAT Review of German Science, Applied Mathematics*, Pt. 1, p. 119–127, **1948.** 149 refs., biblio. p. 121–127. **DLC**—This valuable classified bibliography, after a short introduction, includes: textbooks, general works, and nomograms and special calculating apparatus for mathematics and metrology, mechanics and physics, air currents and air travel (30 entries), machine construction and electrotechnics. *Subject Headings:* **Nomograms, Bibliographies.**

1949

2D–183 551.501.6:551.509.37:551.511

Ananthakrishnan, R. and Yegnanarayan, S., **On the construction, properties and use of the tephigram.** *India, Meteorological Dept., Technical Notes*, Poona, No. 26, **1949.** 46 p. 27 figs., fold. chart, 8 tables. **DWB**—Includes a copy of the India Meteorological Department form of tephigram, with method of construction, choice of scale, plotting of isotherms, isentropics, energy areas, isobars, isohygrics. An account is given of its properties, with auxiliary correction tables and examples of use. *Subject Heading:* **Tephigrams.**

2D–184 551.501.6:551.557

Bindon, H. H., **A plotting hodograph for obtaining thermal winds.** *Canada, Dept. of Transport, Meteorological Div., Circular*, Toronto, No. 1594, **1949.** 6 p. 3 figs. **DWB**—Describes differential (vector) methods in the construction of constant pressure contour charts and a small rubber stamp for printing the hodograph blank on the working chart. *Subject Headings:* **Hodographs, Vectors.**

2D–185 551.501.7:551.509.2:551.511

Fedele, Diego, **Gli emagrammi e le loro caratteristiche geometriche in relazione agli usuali calcoli aerologici.** [Emagrams and their geometric characteristics in relation to ordinary aerological calculations.] *Rivista di Meteorologia Aeronautica*, 9(2):27–37, April–June **1949.** 9 figs., 5 refs., 11 equations. **MH-BH**—(*Same item as* No. 9–16 in Sept. 1950 *Meteorological Abstracts.*) *Subject Headings:* **Aerological diagrams, Emagrams.**

2D–186 551.501.42:551.553.8

Press, Harry, **The application of the statistical theory of extreme values to gust-load problems.** *U. S. NACA, Technical Note*, No. 1926, Nov. **1949.** 43 p. 10 figs. Duplicated. **DLC**—Gumbel's distribution is applied to (1) max. gusts in thunderstorms, and (2) max. accelerations of aircraft. A note on the reliability of prediction and a table of $1-\exp[-e^{-y}]$ for .05 intervals of y from -2.50 to $+8.0$ are included. *Subject Heading:* **Gusts.**

2D–187 551.509.33:551.577.21(74)

Rapp, R. R., **On forecasting winter precipitation amounts at Washington, D. C.** *Monthly Weather Review*, 77:251–256, Sept. **1949.** 2 figs., 6 tables. Summary p. 251. **DWB**—A regression formula is developed between precipitation at Washington and Fulk's functions P (based on mixing ratio at constant pressure) and a function Q based on geostrophic wind at 700 mb. Nomogram devised. *Subject Headings:* **Nomograms, Precipitation forecasting.**

2D–188 551.521

Stranz, D., **Strahlungsmessungen am Geophysikalischen Observatorium Collm.** [Radiation measurements at Collm Geophysical Observatory.] *Leipzig, Universität, Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 15:207–227, **1949.** 2 figs., table, 5 refs. **DWB**—Radiation measurements have been made at Collm since 1935 by LETTAU and the author. Measurements from 1935 to 1943 inclusive were destroyed during the war. Instruments used and corrections, computation, etc. are described in detail. Actual observations and calculated data made on various dates from July 1944 to April 1945 are listed in a 10 page table. (*Same item as* 2.4–91.) *Subject Headings:* **Radiation measurements, Nomograms, Collm Observatory, Leipzig.**—*M.R.*

2D–189 551.501.6:551.511

Syono, S., **On cd-gram.** *Tokyo University, Geophysical Institute, Geophysical Notes*, 2(9):1, **1949.** Div. Met. Contribution No. 13. **DWB**—The nomogram gives ratio "centrifugal" to "deflecting" acceleration. *Subject Heading*: **Nomograms.**

2D–190 551.510.6:551.521.1

U. S. Hydrographic Office, **Arctic solar illumination diagram.** U. S. Pilot Chart North Pacific Ocean, June **1949.** 1 leaf. **DHO**—A large diagram showing character of solar illumination north of 50°N. by latitude and season—total night, astronomical and civil twilight (sun 16° and 7° below horizon), continuous day and alternate day and night. *Subject Headings:* **Illumination, Sunlight.**

1950

2D–191 551.501.4:551.557

Antisari, Ottavio Vittori, **Nomogrammi per la determinazione del vento di gradiente al suolo e in quota.** [Nomograms for determinating the gradient wind on the ground and in the upper air.] *Rivista di Meteorologia Aeronautica*, 10(1):18–28, Jan.–March **1950.** 7 figs., 13 equations. Italian, French, English, German summaries p. 18. **MH-BH**—A number of graphical solutions of the gradient wind equation are examined and the construction of a nomogram illustrated. (*Same item* as 2.1–16 in Jan. 1951 *Meteorological Abstracts*.) *Subject Headings:* **Gradient winds, Nomograms.**

2D–192 551.501.4:551.571

Bilham, E. G., **New version of the humidity slide-rule.** *Meteorological Magazine, London*, 79(933):65–74, March **1950.** 3 figs., 3 refs., 6 equations. **DWB**—(*See item* No. 6–8, *Meteorological Abstracts*, June 1950.) *Subject Headings:* **Methods of Computation, Humidity.**

2D–193 551.58(02)

Conrad, Victor and Pollak, Leo Wenzel, **Methods in climatology. Including some methods in general geophysics.** 2nd ed., rev. and enl. Cambridge, Harvard University Press, **1950.** 459 p. 115 figs., 99+tables, refs., numerous equations, 7 append. **MH-BH, DLC**—Chapter 3, "Aids to computation," includes "Nomograms and computation charts" (5 figs., 23 refs.) and "Tables" (18 refs.). The former discusses transformations of scales and the double-scale nomogram, and indicates the use of Cartesian charts and the alignment type of nomogram in evaluating the functions $\frac{1}{2}(\alpha \pm \beta)$, $\sqrt{(\alpha\beta)}$, $\alpha\beta$, $\sqrt{(\alpha/\beta)}$, $\alpha^2-\beta^2$ with example $\frac{.001293}{1+.00367\,t}\cdot\frac{b}{760}$ gm./cm³. (*Same item as* 2.1–150, *Meteorological Abstracts*, Jan. 1951.) *Subject Heading:* **Nomograms.**

2D–194 551.501.45:551.511

Doporto, Mariano, **Theory and description of a gradient wind computer.** *Eire, Dept. of Industry and Commerce, Meteorological Service, Geophysical Publications*, 3(1), **1950.** Price 6s. 8 p. 6 figs., table, 17 equations. **MH-BH**—In order to avoid the use of geostrophic winds for gradient winds, a scale and handy device for using the scale has been developed for use in daily weather map analysis and flight forecasting. It is based on Petterssen's theory, with extensions to include displacement of anticyclones, computation of frontal velocities, isallobaric gradients, etc. Component graphs, tables and a model of a computing sheet are included along with discussion. *Subject Headings:* **Gradient wind scales, Nomograms.**—*M.R.*

2D–195 551.501.4:551.508.27

Goldschmidt, J., **Bemerkungen zu den nomographischen Psychrometertafeln von E. Pelz und G. R. Haake und zu den Messungen der Lufttemperatur in Thermometerhütten.** [Remarks on the nomographic psychrometer tables of E. Pelzl and G. R. Haake and on the measurements of air temperature in thermometer screens.] *Zeitschrift für Meteorologie*, 4(7–8):240–243, July–Aug. **1950.** fig., equation. **MH-BH**—1. Describes briefly the tables constructed to replace Assmann aspiration psychrometer tables (out of print). They differ little from Assmann's. 2. Investigates effect of size, color and construction of thermometer screens on temperature readings; none were sufficiently accurate. A screen with narrow double louvres was worst, being over 2°C. too high at 14 h. on a nearly calm radiation day in spring. *Subject Headings:* **Nomograms, Psychrometer tables.**

2D–196 551.501.6:551.511.571

Montgomery, R. B., **The Taylor diagram (temperature against vapor pressure) for air mixtures.** *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 2(2–3):163–183, **1950.** 4 figs., 40 refs., 25 equations. English, German and French summaries p. 163–164. **DWB, MH-BH**—(*Same item* as No. 7–11, July 1950, in *Meteorological Abstracts*.) *Subject Headings:* **Physical constants, Taylor diagram, Nomograms.**

2D–197 551.501.6:551.594.7

Swingle, Donald M., **Nomograms for the computation of tropospheric refractive index, its gradients and discontinuities.** Harvard University, Cruft Laboratory, Cambridge, Mass., Feb. 25, **1950.** 15 leaves. 3 figs., table, 24 refs., 28 equations. Office of Naval Research, Contract N5ori-76, Task Order No. 28, NR-071-011, Technical Report No. 102. **MH-BH**—Index of refraction n of moist air is given by $(n-1)\times 10^6 = \frac{74'4}{T}\left(p+\frac{4973\,e}{T}\right)$ valid for electromagnetic waves down to 1.5 cm. Three sets of nomograms are given, designed for use with radiosonde ascents: (1) for refractive index in terms of density of atmospheric gases and dew point, (2) for discontinuities due to discontinuities of air temperature and dew point, and (3) for gradients of refractive index in terms of

gradients of temperature and dew point. *Subject Headings:* **Nomograms, Refraction of electromagnetic waves.**

2D–198 551.501.6:551.571

Tizzano, Antonio, **Sulla determinazione e sul calcolo dell'umidità dell'aria.** [On the determination and evaluation of the humidity of the air.] *Geofisica Pura e Applicata*, 16(3–4):136–140, April–June **1950.** 2 figs., tables, 6 equations. Italian and English summaries p. 136. **MH-BH**—Two nomograms (and data on which they are based) are presented for calculating the relative humidity and the saturation deficit of the air from dry- and wet-bulb readings of a psychrometer. Formulas used are discussed. *Subject Headings:* **Humidity measurements, Nomograms.**—*M.R.*

SUPPLEMENTARY MATERIAL

(Came to our attention too late for inclusion in proper order)

2D–199 551.501.6:551.510.4

Gullstrand, T., **Atmosfärens sammansättning och egenskaper.** [Composition and properties of the atmosphere.] *Sweden, (K.) Tekniska Högskolan—Institutionen för Flygteknik, Technical Notes* No. 1, **1949.** 48 leaves. 4 figs., tables, 54 refs., 40 equations. **DBS**—This monograph covers the following topics: composition, temperature and structure of the atmosphere; derivation of equations relating barometric pressure to height considering an isothermic and polytropic atmosphere; the various types of standard atmospheres giving the fundamental constants and tables of values of pressure, density, temperature and speed of sound up to elevations of 50,000 feet. Approximate formulas for determining the variations of density with elevation are derived; methods of calculation of actual height of aircraft above the ground; velocity of sound; and equations and tables concerned with the dynamic and kinematic viscosity of air are included. The treatment is concise and the monograph is a good reference book. *Subject Headings:* **Nomograms, Atmospheric composition.**—*I.L.D.*

2D–200 620.8

Allcock, H. J. and Jones, J. Reginald, **The nomogram.** New York, Pitman, **1950.** 4th ed. rev. by J. G. L. Michel. 238 p. 81 figs., 70 equations, 3 append. **DLC**—A textbook which takes up systematically the different classes of nomograms and their construction. Two chapters are devoted to nomograms of the third class and one chapter to nomograms of the fourth and higher classes. A chapter on miscellaneous forms of nomograms explains how to construct polar, hexagonal, circular nomograms and intersection diagrams, and formulas containing two, three and four variables. *Subject Headings:* **Nomograms, Textbooks.**—*M.R.*

PART III. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Note: The contents of periodicals included in this section are for information only and will not be listed in either the author or subject indexes. When material is furnished in advance of date of publication, the pagination may be omitted.

American Meteorological Society, Bulletin, Volume 32, Number 1, January 1951.

Fawbush, E. J., Miller, R. C. and Starrett, L. G.: **An empirical method of forecasting tornado development,** p. 1–9.

Wexler, H.: **On the effects of volcanic dust on insolation and weather (I),** p. 10–15.

Stephens, Briscoe F.: **A method of analyzing weather effects on electrical power consumption,** p. 16–20.

Stommel, Henry: **An elementary explanation of why ocean currents are strongest in the west,** p. 21–23.

Comissot, N. A.: **The pH of the rain at Beirut and of the snow on the mountains of Lebanon,** p. 24–26.

Battan, Louis J.: **The "Thunderstorm-Project" data,** p. 27–29.

Ohta, S.: **On the contents of condensation nuclei and uncharged nuclei on the Pacific Ocean and the Japan Sea,** p. 30–31.

Hamilton, E. L. and Andrews, L. A.: **San Dimas rainfall and wind velocity recorder,** p. 32–33.

American Meteorological Society, Bulletin, Volume 32, Number 2, February 1951.

Houghton, Henry G.: **An appraisal of cloud seeding as a means of increasing precipitation,** p. 39–46.

Reynolds, S. E. and Hume, Wm. II, Vonnegut, Bernard and Schaefer, Vincent J.: **Effect of sunlight on the action of silver iodide particles as sublimation nuclei,** p. 47.

Wexler, H.: **Spread of the Krakatoa volcanic dust cloud as related to the high-level circulation,** p. 48–51.

Colón, José A.: **On the wind structure above the tropopause over Puerto Rico,** p. 52–53.

Graves, Maurice E.: **The relation between the tropopause and convective activity in the subtropics (Puerto Rico),** p. 54–60.

Malkus, Joanne Starr, Bunker, Andrew F. and McCasland, Kenneth: **A formation of pileus-like veil clouds over Cape Cod, Massachusetts,** p. 61–66.

Anderson, L. J. and Heibeck, H. L.: **A tau-meter for rapid-response temperature recording systems,** p. 67–71.

Nurminen, Aili: **Wind convergence as a factor in persistent radiation fog,** p. 72–73.

American Meteorological Society, Bulletin, Volume 32, Number 3, March 1951.

Shisler, Karl: **An initial solution to the hurricane problem of the offshore oil operator in the Gulf of Mexico,** p. 79–83.

Harrison, Henry T.: **Results of synoptic tests applied to certain forecasting rules,** p. 89–96.

Alpert, Leo: **An atmospheric cross-section over the tropical Eastern Pacific during a strong Norther, November 16, 1942,** p. 97–101.

Fultz, Dave: **An unusual optical double-refraction at high levels in the tropics,** p. 102.

A brief history of the Department of Meteorology at Massachusetts Institute of Technology, p. 103–104.

Harrison, H. T.: **United Air Lines and its weather service,** p. 104–107.

The Department of Meteorology, College of Engineering, New York University, p. 107–108.

The Spartan School of Aeronautics, p. 108–110.

The Department of Meteorology, Florida State University, p. 110–111.

The General Mills Aeronautical Research Laboratories, p. 111–112.

Arctic, Volume 2, Number 2, August 1950.

Manning, T. H. and Rae, R. W.: **Tidal observations in Arctic waters,** p. 95–104.

Review

Sharp, Robert P.: **Glacial-meteorological investigations on the Karsa Glacier in Swedish Lappland** and **The shrinkage of the Karsa Glacier and its probable meteorological causes,** p. 113–116.

Journal of Atmospheric and Terrestrial Physics, Volume 1, Number 1, 1950.

Bartels, Julius: **27-day variations in F_2 layer critical frequencies at Huancayo,** p. 2–12.
Hess, Victor F. and Vancour, Roger P.: **The ionization balance of the atmosphere,** p. 13–25.
Israël, H.: **Luftelektrische Tagesgänge und Luftkörper. (Studien über das atmosphärische Potentialgefälle III),** [Atmospheric electricity variations and air masses. (Studies on the atmospheric potential gradient III)], p. 26–31.
Pickard, Greenleaf W. and Stetson, Harlan T.: **Comparison of tropospheric reception at 44.1 mc and 92.1 mc over the 167-mile path, Alpine, New Jersey to Needham, Mass. 1947–1948,** p. 32–36.
Dieminger, W. and others: **Solare und terrestrische Beobachtungen während des Mögel-Dellinger-Effektes (SID) am 19. November 1949,** [Solar and terrestrial observations during the Mögel-Dellinger effect (SID) on November 19, 1949], p. 37–48.
Chackett, K. F., Paneth, F. A. and Wilson, E. J.: **Chemical analysis of stratosphere samples form 50 and 70 km height,** p. 49–55.
Hogg, A. R.: **Cosmic rays and solar relationships,** p. 56–62.

Journal of Atmospheric and Terrestrial Physics, Volume 1, Number 2, 1950.

Stanley, J. P.: **The absorption of long and very-long waves in the ionosphere,** p. 65–72.
Becker, Walter: **Über die Dämpfung der ausserordentlichen Komponente in der E_1-Schicht der Ionosphäre,** [On the extinction of the extraordinary components in the E_1-layer of the ionosphere], p. 73–81.
Whale, H. A. and Stanley, J. P.: **Group and phase velocities from the magneto-ionic theory,** p. 82–94.
Baral, S. S. and Mitra, A. P.: **Ionosphere over Calcutta. (Solar half-cycle January 1945–June 1950),** p. 95–105.
Appleton, Sir Edward: **Studies of the F_2 Layer in the ionosphere. I. The position of the ionospheric equator in the F_2 Layer,** p. 106–113.
Hogg, A. R.: **Some time variations of cosmic rays,** p. 114–120.
Chapman, Sydney: **Upper atmospheric nomenclature,** p. 121–124.

Journal of Atmospheric and Terrestrial Physics, Volume 1, Number 3, 1951.

Bowen, E. G.: **Radar observations of rain and their relation to mechanisms of rain formation,** p. 125–140.
Nicolet, M.: **Effects of the atmospheric scale height gradient on the variation of ionization and short wave absorption,** p. 141–146.
Veldkamp, J.: **On the propagation of sound over great distances,** p. 147–151.
Westfold, K. C.: **The interpretation of the magneto-ionic theory,** p. 152–186.
Dolbear, D. W. N., Elliot, H. and Lawton, D. I.: **The cosmic ray intensity and radio fade-outs,** p. 187–188.
Chapman, Sydney: **Notes on aurorae and magnetic storms. I. Considerations as to a model experiment,** p. 189–199.
Gerson, N. C. and Kaplan, J.: **Nomenclature of the upper atmosphere,** p. 200.
Chapman, Sydney: **Upper atmospheric nomenclature,** p. 201.

Journal of Meteorology, Volume 8, Number 1, February 1951.

Willett, H. C.: **Extrapolation of sunspot-climate relationships,** p. 1–6.
Gunn, Kenrick and Hitschfeld, Walter: **A laboratory investigation of the coalescence between large and small water-drops,** p. 7–16.
James, R. W.: **On the evolution of tropical cyclones,** p. 17–24.
Palmén, E. and Newton, C. W.: **On the three-dimensional motions in an outbreak of polar air,** p. 25–39.
Barrett, Earl W. and Herndon, Lee R., Jr.: **An improved electronic dew-point hygrometer,** p. 40–51.
Lorenz, Edward N.: **Seasonal and irregular variations of the Northern Hemisphere sea-level pressure profile,** p. 52–59.
Neumann, J.: **Land breezes and nocturnal thunderstorms,** p. 60–67.
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Scorer, R. S.: **Atmospheric signal velocity,** p. 68–69.
Charney, J. G.: **Reply,** p. 69–70.

Marine Observer, Volume 21, Number 152, April 1951.

The Marine Observers' log—April, May and June, p. 72.
Gordon, A. H.: **Waterspouts—Pt. II,** p. 87.

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Southern ice reports—April, May and June, 1950, p. 98.
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Brooks, C. E. P.: **Oceans through the ages,** p. 103.
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Meteorological Magazine, London, Volume 80, Number 944, February 1951.

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Kirk, T. H.: **A systematic smoothing technique useful in the construction of marine climatological charts,** p. 46.
Whiten, A. J.: **Exposure of earth thermometers,** p. 48.
Smith, L. P.: **Temperatures under Dutch lights,** p. 50.
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Ablation in the Scottish Highlands, p. 58.

Meteorologische Rundschau, Volume 4, Number 1–2, Jan.–Feb. 1951.

Schmitz, Hans Peter: **Eine approximative Ermittlung der durch Druckänderungen bedingten Vertikalbewegung in der planetarischen Grenzschicht,** [An approximate evaluation of the vertical motion in the planetary boundary layer caused by changes of pressure], p. 1–7.
Stümke, H.: **Theorie der Weiterentwicklung von stabilen atmosphärischen Druckfeldern,** [Theory of the further development of stable atmospheric pressure fields], p. 7–13.
Sieber, Peter: **Die quasistationäre Vertikazirkulation,** [The quasi-stationary vertical circulation], p. 13–16.
Weber, Siegfried: **Die Änderung der relativen Topographie durch Advektion,** [Change of the relative topography through advection], p. 16–20.
Voigts, Heinrich: **Mittlerer Gang der Jahresmitteltemperatur im Sonnenfleckenzyklus,** [Average variation of annual mean temperature in the sunspot cycle], p. 20–22.
Vowinckel, Eberhard: **Temperatur und Feuchtigkeit der bodennahen Luftschicht in Pretoria,** [Temperature and humidity of the air layer near the ground at Pretoria], p. 22–23.
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Lamp, Reiner: **Erweiterte Anwendungsmöglichkeit der Wolkenzugsmessung durch Wolkenspiegel,** [Further possible application of measurement of cloud motion by cloud mirror], p. 30.
Pohl, Wolfgang: **Das Hagelgewitter im oberbayerischen Voralpengebiet am Nachmittag des 27. August 1950,** [The hail thunderstorm in the Upper Bavarian Alpine foreland on the afternoon of August 27, 1950], p. 30–31.
Brose, Karl: **Klimagramme,** [Climagrams], p. 31–32.

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Charney, J. G., Fjörtoft, R. and von Neumann, J.: **Numerical integration of the barotropic vorticity equation,** p. 237–254.
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Rosenkranz, Friedrich: **Klimacharakter, Natur und Wirtschaft,** [Climatic character, nature and husbandry], p. 1–8.
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Zeitschrift für Meteorologie, Volume 4, Number 7–8, July–August 1950.

Kreutz, Wilhelm: **Bodenerwärmung und Trockenheit sowie Ursachen der Dürre im ungewöhnlich langen und heissen Sommer 1947,** [Soil warming and dryness and the causes of drought in the unusually long and hot summer 1947], p. 195–212.

König, W.: **Die Januarsingularität im jährlichen Luftdruckgang Deutschlands in synoptischer Betrachtung,** [The January singularity in the annual pressure variation of Germany considered synoptically], p. 212–216.

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Sonntag, D.: **Beobachtung eines Mondhalos am 31. August 1950,** [Observation of a lunar halo on 31 Aug. 1950], p. 253.

Zeitschrift für Meteorologie, Volume 5, Number 1, January 1951.

Foitzik, L.: **Sichtbeobachtung—Sichtmessung,** [Visibility observation—measurement], p. 1–14.

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★**Journal of Meteorology,** American Meteorological Society, [Boston].

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